RECORD OF DECISION
EAGLE ZINC SUPERFUND SITE
OPERABLE UNIT 2
HILLSBORO, ILLINOIS

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION 5

CHICAGO, ILLINOIS

SEPTEMBER 2012

TABLE OF CONTENTS

LIST OF ACRONYMS

AOC	Administrative Order on Consent
ALM	Adult Lead Modeling
ARAR	Applicable or Relevant and Appropriate Requirements
ATSDR	Agency for Toxic Substances and Disease Registry
BERA	Baseline Ecological Risk Assessment
bgs	Below ground surface
BLL	Blood Lead Level
CERCLA	Comprehensive Environmental, Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
COPC	Contaminant of Potential Concern
CSF	Cancer Slope Factor
CSM	Conceptual Site Model
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Differences
ESI	Expanded Site Inspection
FS	Feasibility Study
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
IC	Institutional Control
IUR	Inhalation Unit Risk
MCL	Maximum Contaminant Level
msl	mean sea level
NCP	National Oil and Hazardous Substance Pollution Contingency Plan
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
OU	Operable Unit
PA	Preliminary Assessment
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PEC	Probable Effects Concentration
ppb	Parts per billion
ppm	Parts per million
RAO	Remedial Action Objective
RfC	Reference Concentration
RfD	Reference Dose
CL	Cleanup level
RI	Remedial Investigation
ROD	Record of Decision
RSL	Regional Screening Level
SLERA	Screening Level Ecological Risk Assessment
SPLP	Synthetic Precipitation Leaching Procedure

SRI	Supplemental Remedial Investigation
SVOC	Semi-Volatile Organic Compound
TBC	To Be Considered
TCLP	Toxicity Characteristic Leaching Procedure
TOC	Total Organic Carbon
UCL	Upper Confidence Limit
VOC	Volatile Organic Compound
XRF	X-Ray Fluorescence

RECORD OF DECISION

This Record of Decision (ROD) documents the remedy selected for Operable Unit 2 (OU 2) of the Eagle Zinc Superfund Site in Hillsboro, Illinois. The ROD is organized in three parts: Part I contains the *Declaration* for the ROD, Part II contains the *Decision Summary*, and Part III contains the *Responsiveness Summary.*

PART I: DECLARATION

This section summarizes the information presented in the ROD and includes the authorizing signature of the U. S. Environmental Protection Agency (EPA) Region 5 Superfund Director.

Site Name and Location

Eagle Zinc Superfund Site
Operable Unit 2
Hillsboro, Montgomery County, Illinois
Superfund Identification Number: ILD980606941

Statement of Basis and Purpose

This Record of Decision (ROD) documents the EPA's selection of a remedy for OU 2 of the Eagle Zinc Site (Site). The remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and, to the extent practicable, the National Oil and Hazardous Substances Contingency Plan (NCP).

Information used to select the remedy is contained in the Administrative Record (AR) file for the Site. The AR file is available for review at the Hillsboro Public Library at 214 School Street, Hillsboro, IL 62049 and at the EPA Records Center on the 7th floor of the Region 5 office building at 77 West Jackson Blvd, Chicago, Illinois, 60604.

Assessment of the Site

The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

Description of the Selected Remedy

The selected remedy for OU 2, which represents the final action for the Eagle Zinc Site, includes the following components:

- ***Hazardous Waste Treatment*:** About 2,100 cubic yards of residue material, which exhibits the characteristic of leachability will be consolidated into one designated area and treated in-situ using immobilizing agents. The specific immobilization mix will be chosen during the remedial design and will be based on cost-effectiveness and ability to prevent leaching.
- ***Onsite Consolidation and Containment*:** Consolidation and cover of residue, soil, and sediment exceeding the cleanup levels, which are set to protect against unacceptable exposure risks. Demolition materials from OU 1 will also be consolidated under the cover. The material will be spread over approximately 22 acres and covered with an Illinois Administrative Code (Ill. Adm. Code) 807-compliant cover. This 22-acre consolidated area includes the southwestern pond, which will be filled in with the consolidated materials.
- ***Stream Re-alignment, Sediment Excavation, and Wetland:*** The westward flowing ephemeral stream will be realigned to reduce surface water connection with the existing residue and return the ephemeral stream to its natural flow pattern. The wetland area along the stream will be excavated to accommodate the stream re-alignment and a new wetland footprint will be constructed. Contaminated sediment from the former stream bed will be excavated, as needed, and consolidated with the residue underneath the cover. These areas will be stabilized with native seed and native riparian trees and shrubs. Sediment from the ditch and stream located along the southern perimeter of the Site, onsite ponds, and the offsite tributary to the northeastern stream system that drains toward Lake Hillsboro will be remediated by excavation and onsite disposal under the soil cover.
- ***Institutional Controls*:** A Uniform Environmental Covenant is already in place on the property to notify future property owners that the residue and soil at the Site poses potential risks to human health and the environment. The Covenant restricts the use of groundwater and prevents disturbance of the remedy. The Covenant also prohibits residential use of the property, including homes, hospitals, and schools. The Covenant is binding on future owners and is enforceable by EPA and Illinois EPA.
- ***Monitoring and Assessment*:** There is some contamination in the onsite groundwater but the hydraulic conductivity on the Site is too low to produce sufficient water to be used for drinking. The groundwater is not considered potable and EPA does not expect drinking water wells will be used onsite in the future, because the aquifer is not productive and because the wells are prohibited by the Environmental Covenant. The groundwater will not be actively remediated but the removal of the residue, contaminated sediment, and stream realignment is expected to effectively address the source of the contamination in the groundwater. EPA will continue to monitor the groundwater and surface water quarterly, providing annual reports that will document the analytical results, site inspections, trend analyses, and recommendations for the site-specific monitoring

program. If groundwater conditions change, appropriate steps will be taken to address any unacceptable risk or impairment to beneficial use.

The principal threat wastes at the Site are the residue piles that contain characteristically hazardous waste. The selected remedy will treat the principal threat wastes at the Site by immobilizing the residue piles. The majority of the residue onsite exceeds cleanup goals but is not characteristically hazardous. This non-hazardous residue will not be treated because it can easily be contained onsite.

Statutory Determination

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to this remedial action. The selected remedy is cost-effective, and utilizes permanent solutions and alternative treatment technologies to the maximum extent practical.

The remedy also satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment) since source materials constituting principal threats (i.e., residue piles) will be treated to reduce mobility of hazardous substances.

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining onsite above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

ROD Data Certification Checklist

The following information is included in the Decision Summary section (Part II) of this ROD. Additional information can be found in the Administrative Record file for this Site.

- Contaminants of concern and their respective concentrations (Section 8)
- Baseline risk represented by the contaminants of concern (Section 8)
- Cleanup levels established for contaminants of concern and remedial action objectives established for the Site (Section 9)
- Manner of addressing source materials constituting principal threats (Section 12)
- Current and reasonably anticipated future land use and current and potential future beneficial uses of groundwater assumed in the baseline risk assessment (Section 7)
- Potential land and groundwater use that will be available at the Site as a result of the selected remedy (13.4)
- Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected (Section 13.3)

- Key factors that led to selecting the remedy (Section 13.1)

Support Agency Acceptance

The Illinois Environmental Protection Agency (Illinois EPA) was consulted on the proposed plan and Illinois EPA has verbally expressed their concurrence on the selected remedy. The letter documenting their concurrence will be added to the Administrative Record upon receipt.

Authorizing Signature

Sept. 6, 2012

for Richard C. Karl, Director
Superfund Division
United States Environmental Protection Agency, Region 5

Date

PART II: DECISION SUMMARY

1.0 Site Name, Location, and Description

The Eagle Zinc Site (Site) is located in a mixed industrial/commercial/residential area in Hillsboro, IL, in Montgomery County. The Site is currently zoned commercial/industrial. The Site is bordered on the east by Industrial Park Drive and the Litchfield Bituminous Corporation; on the north by Smith Road, Hayes Abrasives, and the City of Hillsboro Water Treatment Plant; on the west by East Brailley Road and Street, Larkin Street, and residential housing; and on the south by Fuller Brother Ready Mix Concrete facility, Vogel Lumber yard, and the University of Illinois Extension office. The Site is approximately 132 acres and is covered with 23 building/structures over about 30 acres. The Site is divided into operable units (OUs). OU 1 consists of the contaminated buildings and immediately adjacent areas on the Site. An interim record of decision (ROD) was signed for OU 1 in September 2009. The focus of this ROD is OU 2, and includes the waste piles, residue, soil, surface water, groundwater, and sediment for the Site. The Site contains several railroad spurs, residual material, two storm water retention ponds, one larger pond in the southwestern portion of the Site, one small pond in the southeastern portion of the Site, and several roads formerly used for facility operations.

For this fund-financed cleanup the U.S. Environmental Protection Agency (EPA) is the lead agency for the Site; Illinois EPA is the support agency.

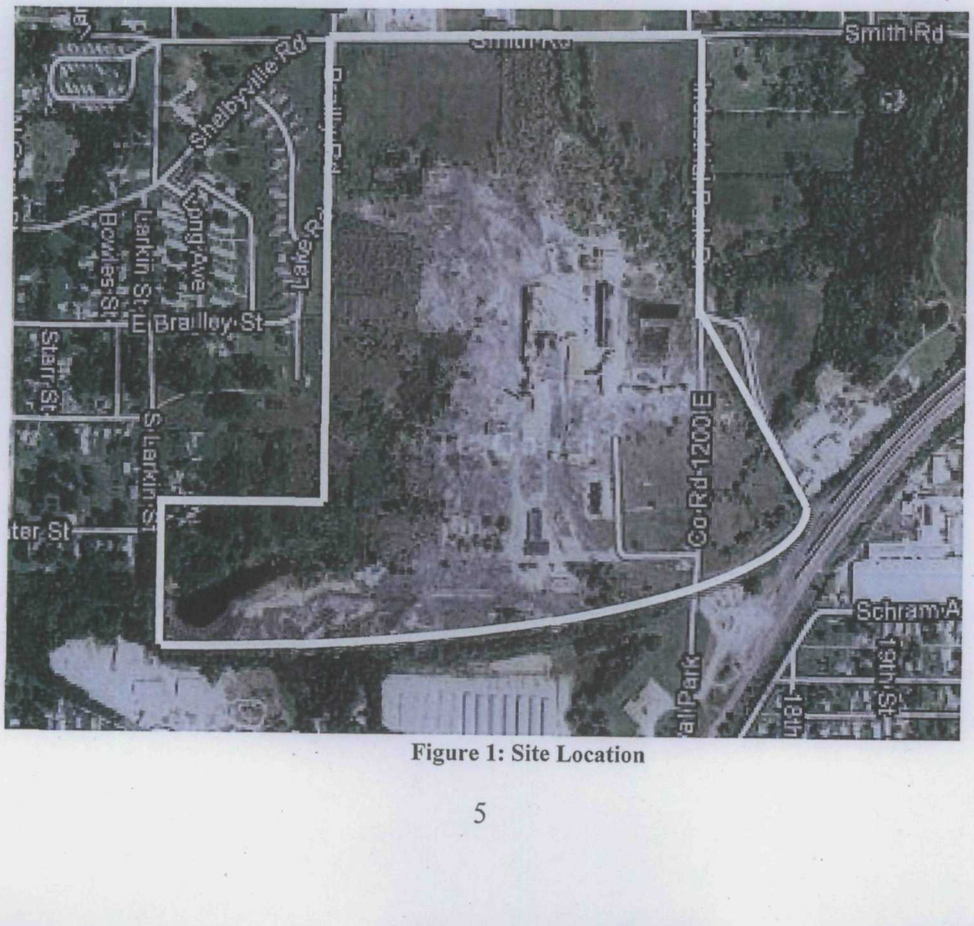

Figure 1: Site Location

2.0 Site History and Enforcement Activities

2.1 Site History

From 1912 to 2003, the Site was used for smelting and for manufacturing of sulfuric acid, zinc oxide, and leaded zinc oxide. Residuals from the plant operations were placed across the Site and in residue piles that have been categorized based on the processes that generated them. The Site originated as a zinc smelter facility under the name Lanyon Zinc Company in 1912. Lanyon Zinc Company produced various smelting products including zinc and sulfuric acid. The facility was then purchased by Eagle-Picher Industries in 1919. Eagle-Picher Industries operated and produced similar products until about 1935. During the early 1920s Eagle-Picher Industries began manufacturing zinc oxide and lead zinc oxide. Manufacturing of lead zinc oxide continued until around 1958 and production of zinc oxide continued until around 1980 when the facility was purchased by Sherwin-Williams Company. In 1984, the facility was sold to Eagle Zinc Company, a division of T.L. Diamond and Company. Eagle Zinc continued the production of zinc oxide until 2003 when the facility ceased industrial operations.

According to historical documents, during industrial operations large amounts of ore and smelter waste were stored onsite. The leaded zinc oxide that was made at the Site was produced using the American process, which combined zinc ore concentrates with high levels of impurities. Waste materials generated from this process included slag rotary kiln residue, muffle dross, metallic zinc particles, and refractory bricks. Significant portions of the Site are currently covered with smelter waste and other materials associated with historical smelting operations. An estimated 43,500 cubic yards of residue waste currently resides onsite in 15 residue piles. Residue is also spread across the Site, and the residue thickness ranges from a few inches thick to 28 feet thick based on soil borings; totaling approximately 210,000 cubic yards of residue. In addition, 43,500 cubic yards of residue are consolidated into 15 piles around the Site.

2.2 Enforcement History

The zinc smelting and zinc oxide production facility was listed on the Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) in June 1981 as a discovery action. Sherwin-Williams notified EPA that slag/residual material had been disposed of onsite. Results from Illinois EPA sampling indicated that the waste materials were not hazardous wastes and that the Site was not subject to the Resource Conservation and Recovery Act (RCRA) permit requirements. Illinois EPA took additional samples of the surface water from the storm water discharge and found some metals (zinc, iron, lead, and copper) exceeded the state surface water quality standards on more than one occasion. Therefore, Sherwin-Williams received a notice of violation from the Illinois EPA, which resulted in the removal of approximately 18,000 tons of residue materials from about 10 acres of the Site.

In April 1998 Eagle Zinc removed a 500-gallon gasoline underground storage tank and submitted a leaking underground storage tank (LUST) report to Illinois EPA. An investigation by Illinois EPA followed the report. No detections of benzene, toluene, ethyl benzene, and xylene (BTEX) compounds were found in the soil or groundwater. The groundwater was monitored for BTEX compounds for three years. In 2004 Eagle Zinc received a No Further Remediation letter for the former LUST.

In May 1998, Eagle Zinc entered into an Interim Consent Order with the Illinois Attorney General and Illinois EPA. The Consent Order required a groundwater monitoring program, a soil sampling program, and a storm water pollution prevention plan (SWPP). The SWPP led to the determination the Site was subject to National Pollutant Discharge Elimination System (NPDES) storm water permitting requirements. In 2000, Eagle Zinc was issued a permit that required monthly monitoring of the NPDES Outfall and an annual inspection report. The permit was terminated upon closure of the facility in 2003.

In 2001, EPA issued an Administrative Order on Consent (AOC) to potentially responsible parties (PRPs) Eagle Zinc, Sherwin-Williams, and Eagle Picher to conduct the Remedial Investigation (RI) and Feasibility Study (FS) for the Site. Under this agreement the companies submitted the following draft reports: RI Report (January 2005), RI Addendum (February 2006) and FS (May 2006). The Illinois EPA completed the Hazard Ranking Score (HRS) for the Site in March 2007. Based on the Site's overall score, Illinois EPA recommended that the Site be placed on the National Priorities List (NPL). The Site was placed on the NPL in September 2007.

In 2007, T.L. Diamond signed a cash-out settlement with EPA for $750,000, which helped fund the OU 2 investigation and the OU 1 remedial design. EPA is currently negotiating with Sherwin-Williams to recover additional cleanup costs and EPA has filed a claim for its costs in the Eagle-Picher bankruptcy proceedings.

2.3 Previous Investigation Activities

In 1982, Sherwin-Williams conducted an environmental risk assessment of the Site, using data collected two years prior. Based on the sampling data no environmental risk was identified. Unfortunately, an accurate map of the soil sampling locations taken for this assessment is not available. In 1984, a preliminary site assessment (PA) was conducted by Illinois EPA and submitted to EPA. The report concluded that the soil samples from the early 1980s were not hazardous waste and therefore not subject to RCRA regulations.

In 1993, Illinois EPA conducted an expanded site inspection (ESI) in order to provide significant documentation to support the Site CERCLA Hazard Ranking System (HRS) record. The ESI included 28 sediment, residue, and soil samples from both onsite and offsite locations. Background samples were collected from Butler, a town close to Hillsboro. The sample results indicated that there were high concentrations of heavy metals like cadmium, copper, and zinc in the soil and residue piles. The ESI report was completed in 1996. A few years later, in 1998, the LUST investigation took place; no BTEX contamination was detected in the soil or groundwater.

In 1999, groundwater monitoring was required under a State Consent Order. The results show that the groundwater exceeded Illinois Class I groundwater standards for total iron and sulfate. The high levels of iron and sulfate in the water led to the initiation of a complete RI/FS under the 2001 AOC between EPA and T.L. Diamond (Eagle Zinc), Sherwin-Williams, and Eagle Picher.

The RI was conducted between 2001 and 2005. The RI investigated the Site's physical characteristics, identified sources of contamination, described the nature and extent of contamination, and evaluated the risk to human health and the environment. Field investigation activities included samples from the groundwater, residue piles, and onsite and offsite surface and subsurface soil. The samples were analyzed for volatile organic compounds (VOCs), semi-VOCs, polychlorinated biphenyls, inorganic constituents, and toxic characteristic leaching procedure (TCLP) and/ or synthetic precipitation leaching procedure (SPLP) characteristics. Air modeling and soil deposition calculations were also created to determine if there were any airborne emissions of concern from the residue piles.

The 2005 RI and RI addendum compared the chemical concentrations on the Site to conservative screening levels in order to identify potential chemicals of concern for the residue piles, soil, sediment, surface water and groundwater. Three of the residue piles were categorized as potential areas of concern because the TCLP values exceeded the RCRA hazardous waste threshold, i.e. the contaminants are characteristically hazardous because they are likely to leach from the residue pile materials when exposed to acidic liquid. Other potential areas of concern included isolated soil areas, sediment and surface water in limited portions of the eastern and western drainage ways, and the groundwater in the south west portion of the Site and a small offsite area. A human health risk assessment (HHRA) and a screening level environmental risk assessment (SLERA) were conducted as part of the 2005 RI. The ecological risk assessments concluded that although there may be some adverse impacts to wildlife, the impacts were negligible. As noted below, EPA and Illinois EPA later reevaluated the SLERA and HHRA conducted under the 2001 AOC to ensure the conclusions were valid. The primary PRPs were unable to complete the FS Report and to address EPA's comments on the RI Report text because Eagle-Picher filed for bankruptcy and T.L. Diamond dissolved its business. EPA therefore proposed the Site for listing on the National Priorities List (NPL) and completed the RI/FS process. The Site was listed on the NPL in September 2007.

In May 2008, Illinois EPA conducted an independent sampling event at the Site to gather additional information on the levels of contamination in and around the buildings, and in the residue spread across the Site. The field events included the collection of 65 residue samples for X-ray Florescence (XRF) analysis and 10 residue samples for laboratory analysis. These samples were collected from multiple locations near the buildings on the Site and were analyzed for total inorganic constituents. An additional 10 samples of residue were collected for TCLP analysis. The results of the XRF sampling event indicated inorganic contamination exceeding the industrial screening criteria was located in, on, and around the dilapidated buildings. These high levels prompted EPA to prioritize a response action for this portion of the Site. The Site was therefore split into two OUs and an interim ROD was signed September 16, 2009 to address the OU 1. In addition, in late 2008 and early 2009 EPA upgraded and extended the fencing along the eastern and western Site boundaries to further restrict access.

In October 2009, EPA and Illinois EPA decided to conduct a supplemental RI/FS for OU 2 which focused on data gaps in the original RI (2005). The supplemental RI (SRI) evaluated the chemicals of concern (COCs) in groundwater screened beneath the residue piles, evaluated the leachability of the residue in areas between the waste piles, compared the levels of metals seen in the residue and the waste piles, and evaluated the presence of COCs in soil beneath the residue. The SRI compared data from the 2005 RI to the data collected in 2010 and updated the HHRA based on the information. In November 2010, EPA collected 32 residue samples, 11 surface soil samples, 41 subsurface soil samples, 21 surface water samples, 17 sediment samples, and 34 groundwater samples. The samples in each media were analyzed for metals. TCLP and SPLP analysis was conducted for some of the soil and residue samples. The data from 2010 was combined with the data from previous investigations and compiled in the SRI report, which was completed in May 2012. A more in-depth discussion about the findings of the 2012 SRI and the nature and extent of contamination is provided in Sections 5 and 7 of this document.

3.0 Community Participation

The SRI and the FS reports describe the nature and extent of the contamination at the Site and evaluate remedial alternatives to address the contamination. EPA and Illinois EPA's preferred remedy and the basis for that preference were identified in a Proposed Plan. These documents were made available to the public in the spring of 2012 at the information repositories: Hillsboro Public Library at 214 School Street, Hillsboro, IL 62049 and the EPA Records Center on the 7th floor of the Region 5 offices at 77 W. Jackson Blvd, Chicago, Illinois, 60604.

As outlined in the 2010 Community Involvement Plan for Eagle Zinc, a notice of the commencement of the public comment period, the public meeting date, a description of the preferred remedy, EPA contact information, and the availability of the above-referenced documents was published in the Hillsboro Journal News, a local newspaper on May 24, 2012. The 30-day comment period ran from May 30 to June 30, 2012. EPA held a public meeting on June 14, 2012 from 6:30 to 8 p.m. at Hillsboro High School to present the findings of the SRI and FS and to answer questions from the public about the Site, the remedial alternatives, and the proposed remedy. Twenty people attended the meeting; including federal and state officials, business people, residents, local government representatives, and outside remedial contractors. Eight people commented on the proposed plan, either at the public meeting or by sending in written comments to EPA. The comments are addressed in the Responsiveness Summary, which is Part III of this document.

In the June 14, 2012 public meeting, in prior public meetings, and in discussions with local officials, EPA sought input on assumptions about reasonably anticipated future use of the Site. The community has generally expressed an interest in reuse of at least part of the Site for commercial and/or industrial purposes.

4.0 Scope and Role of Response Action

In order to more effectively manage the risks posed by the Site, it was divided into two OUs. OU 1 addresses the contamination associated with the dilapidated buildings on the Site, while OU 2 addresses contamination in the residue, soil, groundwater, surface water, and sediment at the Site. EPA has already selected a remedy for OU 1 with an interim ROD signed September 16, 2009. The remedy for OU 1 consists of the demolition of all the buildings onsite with onsite containment. Putrescible and asbestos contaminated material will be disposed of offsite and any RCRA hazardous waste and other materials that cannot be scrapped or recycled will be stockpiled onsite until the final (OU 2) remedial action takes place.

This ROD focuses on the selected remedy for OU 2. The ROD addresses the unacceptable risks posed to human health and the environment by the high concentrations of metals in the Site's residue, soil, groundwater, surface water, and sediment. This second operable unit presents the final response action for the Site and it addresses the principal threat at the Site by consolidating, treating, and containing the RCRA hazardous waste materials and by consolidating and containing the main source of contamination – the residue materials. OU 2 will also incorporate the stockpiled residual material from OU 1 with the other material to be addressed in the OU 2 remedy.

5.0 Physical Characteristics

5.1 Meteorology

Hillsboro has a continental climate with pronounced daily and seasonal temperature changes. Summers are relatively warm and moderately humid, with average temperatures in July and August just below 90 degrees Fahrenheit and average low temperatures around 60 degrees Fahrenheit. Winters are relatively short and generally cool to cold, with January typically being the coldest month of the year. The average winter temperatures range from 19.1 to 36.8 degrees Fahrenheit. The average growing season is 185 days a year. The prevailing winds are generally from the south but also from the west and northwest direction; the average wind speed varies from 8 to 12 miles per hour. Severe storms occur between the months of April and June, and November and March. The average annual rainfall has been about 40.21 inches since 1971. May is the wettest month of the year with 4.31 inches of rain. The average snow for the area is 19.1 inches a year and generally occurs between December and March.

5.2 Surface Water Hydrology

The surface water features on the Site and within the immediate vicinity of the Site consist of one intermittent drainage ditch, two ephemeral streams, two ponds, and two storm water retention ponds. Surface water runoff feeds all the aforementioned surface water features with the exception of the southeastern pond. The southeastern pond is located between two railroad spurs near the Site's southern boundary line. The southeastern pond does not appear to receive surface water runoff and nor does it appear to have an inlet or outlet.

The intermittent drainage ditch runs along the southern property line. It is about 1 to 2 feet wide and fills up with a couple inches of water after only a few inches of rain fall. This drainage ditch eventually feeds into Hillsboro's gravity-fed State Highway 16 drainage ditch near the southwest corner of the Site.

The branches of the westward flowing ephemeral stream originate in the center of the Site, where a small wetland surrounds the origins of the stream. Surface water runoff from the surrounding area collects in several drainage swales and flows south, southwest, or west and then converges at the manmade surface water pond in the southwest corner. This stream is between four and eight feet wide and fills up quickly after a few inches of rainfall. Heavy rainfall events frequently cause surface water to flow over the western bank of the pond at NPDES Outfall 001 and discharge into an unnamed tributary of Middle Fork Shoal Creek – eventually flowing into Shoal Creek, about six miles from the Site.

The branches of the northeastward flowing ephemeral stream originate near the Site's eastern property line. Surface water runoff from surrounding areas collect in several drainage swales and flows north, south or southeast and then converge along the Site's east property line. This stream is about two to four feet wide and fills up quickly during rain events. The stream eventually turns east and flows offsite underneath Industrial Park Drive before eventually discharging into Lake Hillsboro.

Two manmade storm water retention ponds are located near the Site's eastern boundary line along Industrial Park Drive. The retention ponds were installed in the early 2000's in response to a NPDES permit that was issued in the summer of 2000. The storm water collects in the retention ponds only after moderate to heavy rain events. Only after prolonged periods of heavy rainfall events will the surface water flow over the bank at the NPDES Outfall 002, which discharges into the northeastward flowing ephemeral stream.

5.3 Geology

The thickness of the glacial till in Montgomery County is about 50 to 100 feet thick. Based on soil boring logs, Vandalia till, a member of the Glasford Formation, is present at depths ranging from 5 to 22 feet below ground surface (bgs). This formation is composed of relatively sandy, compact glacial till that is gray in color where unoxidized and contains numerous lenticular beds of silt, sand, and gravel. The compact glacial till is gray or grayish brown in color, dense, relatively impermeable, and is composed of an erratic assortment of clay, silt, sand and gravel lenses. Analysis of soil boring logs and the geologic cross section indicate that loess deposits are primarily composed of a mixture of silt and clay that ranges in thickness between 0 and 20 feet. Loess deposits cover most of the Site; the southwest corner has no loess deposits. Below the loess there is relatively compact glacial till with varying percentages of clay, silt, sand, and gravel. Thin, isolated, and loose sand lenses were encountered at depths of 12 to 28 feet bgs, with thickness ranging up to three feet. These lenses are not likely to be continuous. Beneath the loess and glacial till is native bedrock that composed of Pennsylvanian-age Bond Formation. The unit ranges between 100 and 300 feet in thickness and is primarily composed of limestone with some beds of shale and sandstone.

5.3.1 Topography

The Site and surrounding area consists of moderately rolling hills and valleys that are mostly covered by native grasses and northern timber. The topography is fairly variable across the Site with an elevation range between 595 and 640 feet above mean seal level (msl) – topography surrounding the Site has a similar variability and range (560 and 640 feet msl). The highest ground elevation point is in the northwest corner on the Site, and the lowest is in the southwest corner. Ground elevation within the Site is generally dependent upon the thickness of residue material; residue thickness varies from 0 to 28 feet within the Site boundaries. Residue covers a large portion of the Site and has an average thickness of 6.5 feet.

5.3.2 Soils

Montgomery County is principally covered by glacial till and outwash deposits that were deposited during the Illinoisan glacial stage 130,000 to 300,000 years ago, and wind-blown loess material that was deposited between 4,000 and 60,000 years ago. Native soils present at the Site consist of silty loam and clay loam from the Blair, Atlas, Hickory, Bunkum, Marine, and Cowden soil series, originating from the wind-blown loess deposits. The soil present across the Site is composed of 5- to 10-foot thick silt and clay units that are either light orange, light medium brown, or light to dark gray in color; it is firm to stiff, predominately dry at depth, and found on relatively flat ground.

5.4 Hydrogeology

Groundwater flows predominately in the water bearing sand and gravel lenses within the unconsolidated overburden. Depth to groundwater across the investigation area is relatively shallow, typically between two and six feet bgs. The groundwater table is relatively stable and does not significantly fluctuate; however, due to the seasonal variations in precipitation, minor fluctuations in the groundwater table do occur, normally between one and three feet. The groundwater table within the investigation area is typically at its highest elevations in early spring, between 629 and 595 feet msl and at its lowest elevation in late fall, between 628 and 593 feet msl. Analysis of the topographic map, geologic cross section, and potentiometric surface maps indicates that the shallow groundwater flow is influenced by surface topography and the groundwater flow direction is consistent throughout the seasons and over the years. In general, groundwater flows away from the center of the Site with groundwater flowing towards the southwest, southeast, east and northeast and north toward the corresponding portions of the Site.

The hydraulic conductivity values (the speed of groundwater flow) of the groundwater-bearing zones were determined by performing aquifer (slug) tests. The conductivity values ranges from 0.002 feet/day to 1.416 feet/day. The wide range in hydraulic conductivity values is likely attributed to the wide range of grain-size material in which the monitoring wells were screened. Groundwater flows slower in the finer grained soil and faster in coarser grained soil. The conductivity values are common for the type of loess and glacial till associated with the Site. The geometric mean of the groundwater's hydraulic conductivity at the Site is $3x10^{-5}$, too slow to be used as a source of potable water. The Illinois EPA agrees, based on the RI, that the groundwater should be classified as class II (non-potable). Illinois EPA will finalize classification after additional rounds of sampling are taken during the remedial design and remedial action phases of the remedy.

5.5 Ecology

Prairie, upland hardwood forest, forest-prairie, and flood plain are all types of vegetation commonly found in Montgomery County. Within the Site, some areas are moderately to densely vegetated; other areas are sparsely vegetated or are barren of vegetation. The vegetation consists of native prairie grasses and northern hardwood trees such as oak hickory, walnut, ash, cottonwood, and maple. Wildlife common to Montgomery County that would likely inhabit the Site include American robins, northern cardinals, blue jays, mourning doves, horned larks, barn swallows, red-tailed hawks, eastern cottontails, box turtles, common garter snakes, black rat snakes, fox squirrels, red foxes, opossums, raccoons, wild turkey, white-tailed deer, and coyote. According to the Federal Emergency Management Agency (FEMA) Flood Hazard Boundary Map for Montgomery County, Illinois (1991), no portions of the Site or the investigated offsite areas are located within a 500-year or 100-year flood zone.

6.0 Nature and Extent of Contamination

6.1 Residue

The residue and residue piles are the primary source of contamination to the Site. Residue that exceeds the industrial regional screening level (RSL) for soil covers about 56 acres of the Site – approximately 255,000 cubic yards (cy) of residual materials. Total cadmium, copper, manganese, and zinc concentrations were found below their respective RSLs. Total arsenic and lead were found above their RSLs in a large portion of the residue samples; 52% of the samples exceeded the RSL for arsenic and 40% exceeded the RSL for lead. Leachability tests were conducted on the residue samples by using SPLP and TLCP analyses, based on the pH of the material. Because cadmium, lead, manganese, copper and zinc failed the TCLP analysis at a significant number of locations, there is potential for residue and residue piles to leach to groundwater and surface water.

Potential transport pathways for residue include redistribution, infiltration, surface water runoff, and air transport. There is no formal documentation describing how the residue has been distributed outside of the residue in stock piles. However, the general presumption is that throughout daily operations residue was spread across the Site to support traffic ways and as a result of material handling. Redistribution of residue has allowed contaminants to be distributed to larger portions of the former manufacturing area and to the areas in between residue piles. This is the primary transport mechanism for residue to migrate to other media. Although the residue has not impacted the soil beneath it, water has infiltrated the residue, creating contaminated perched water areas that flow into the drainage ways and water bodies on the Site. The prevailing wind direction is north/northeast, so if contamination was transported by wind dispersion, the northern portions of the Site would be impacted. No soil contamination was found on the northern portions of the Site. Also, the residue is naturally crusted, congealed from the source materials. This congealed form binds the erodible material, reducing the erosion potential so that air erosion, if any, would be limited. Contaminant dispersion via air or surface water runoff is not a significant contaminant transport mechanism at the Site.

6.2 Soil

Surface soil (0-2 feet bgs) and subsurface soil (3-5 and 7-9 feet bgs) samples were taken onsite and offsite to determine the extent of Site-related contamination. The soil samples were compared to the industrial RSLs and the Illinois background values for Site-related metals. In general, the soil beneath the residue pile (i.e., the soil not in immediate contact with the residue) is not contaminated above the industrial RSLs. Arsenic was the only contaminant observed in both onsite and offsite soil above the RSL and Illinois background value. Elevated arsenic was observed in subsurface soil beneath the residue; however, only 8% of the samples were slightly above the background value. The levels of arsenic in the surface soil only slightly exceed the Illinois background value in 30% of the samples. Due to the few occurrences only slightly above background it is likely that the arsenic is naturally occurring. The surface and subsurface soil does not appear to be impacted by the residue. Similarly, the levels of arsenic offsite only slightly exceed the Illinois background and the levels of arsenic are considered to be naturally occurring. The migration of Site-related contaminants has been limited by the presence of a relatively impermeable clay layer present across the Site soils.

Elevated manganese was the only metal observed in the offsite surface soil above the industrial RSL and its Illinois background value. Based on the low frequency of elevated manganese in offsite soils and the SPLP data indicating low leaching potential for manganese, the elevated levels of manganese offsite are not considered Site-related. The contamination associated with the Site is limited to the property boundaries of the former Eagle Zinc operations.

6.3 Groundwater and Perched Water

Groundwater is present in relatively impermeable clay, silty clay, and sandy clay below the residue. In addition, perched water is present in a relatively thin zone within the residue spread around the Site above the silty clay. The residue is expected to be much more permeable than the soil. Rainfall would likely infiltrate rapidly through the residue, with minimal evaporation losses, and then flow laterally and discharge into the Eastern and Western Drainage ways with only a small portion percolating into the silty clay and the ground water.

Groundwater was collected from 33 monitoring wells in 2010 and analyzed for total and dissolved Site-specific metals. The analytical results were compared against the Class II standards for the state of Illinois and the federal MCL. However, the groundwater is not considered Class I nor is it currently used for potable purposes onsite or offsite. There is no current or future exposure to the contaminated groundwater so cleanup options were not evaluated to address the groundwater.

Some of the monitoring wells sampled in 2002/2003 are screened in the residue piles. These wells were sampled again in 2010 and the results indicate that the metal concentrations have decreased by 50% to 90% since the 2002/2003 sampling event. The most probable explanation for this is greater care to avoid suspending residue solids during the low-flow sampling activity. Therefore, the sampling results from the 2002/2003 events will not be used to evaluate the groundwater and perched water at the Site. The samples taken in 2010 indicate that the concentrations of Site-specific metals are elevated in these wells. Since the wells are screened in or within close proximity to the residue, it is likely that the results represent infiltration residing in residue perched above the original ground surface. These results are not representative of groundwater at the Site, but they provide valuable information about the transport pathways to groundwater and surface water at the Site.

Arsenic, cadmium, lead, manganese, and zinc were the only Site-specific metals observed above the most stringent value of their respective MCL and Illinois Class I standards for groundwater. Arsenic, cadmium, lead, and zinc groundwater standards were only exceeded in the perched water at the base of the residue or within visible residue. Manganese, on the other hand, exceeded at the screening criteria in the perched water zone and the shallow aquifers. Lateral migration of shallow groundwater through advection has been limited to manganese due to the subsurface geology, and the tendency of the metals to absorb to the silts and clays in the shallow aquifer. Manganese contamination was not found in wells screened further down – about 55 to 65 feet bgs. This means that manganese is not migrating further downward, even though a downward gradient is present.

The contamination is limited to the shallow water within the residue and some shallow groundwater within the silty clay soil beneath it. As mentioned previously, the deeper groundwater, about 55 feet bgs, does not show contamination above the federal MCLs. The perched water that flows through the residue into the drainage systems is a contributing factor to contamination in the surface water and sediment. The cadmium, lead, manganese, and zinc concentrations above screening criteria in the surface water are likely a result of this lateral migration and discharge, as well as surface water runoff from the residue. Addressing the residual material would significantly mitigate this contamination pathway.

6.4 Surface Water

Surface water and sediment sampling took place in 2002 as part of the RI and in 2010 as part of the SRI. Overall, surface water concentrations of arsenic, lead, and manganese increased from 2003 to 2010. However, no overall trend was observed for cadmium, copper, or zinc. The surface water analytical results were compared to the Illinois Water Quality Standards in 35, Illinois Admin. Code Title 35 Part 302, and to EPA's National Ambient Water Quality Criteria for freshwater. The surface water sample results show that the southwest pond and the stream onsite exceed the screening criteria and present a potential risk to the aquatic organisms.

Total lead and manganese concentrations were observed above their respective screening criteria in onsite surface water at low frequencies. Total lead was found in 2 out of 18 sampling locations, but dissolved lead was not found at any of the locations. There were no exceedances in the dissolved surface water samples. It is likely that the two detections of total lead do represent the water quality but are attributable to the suspended fines in the surface water. Similarly, total and dissolved manganese is only found in 1 of 18 sampling locations. The manganese detection is probably due to Site operations and is likely from the manganese found in the groundwater.

Total and dissolved cadmium and zinc were both observed above their screening criteria in most of the sampling locations, with the exception of cadmium not being detected in the southeastern surface water pond. The high levels of cadmium and zinc in the onsite surface water is likely due to Site operations and the concentration of those contaminants in the groundwater and perched water.

Offsite surface water samples exceed the screening criteria for total lead and manganese concentrations at low frequencies. It is likely that the exceedances are due to suspended fines in the turbid, intermittent drainage ditch that flows east to west. Total and dissolved cadmium, manganese, and zinc concentrations are likely due to Site operations and the concentrations of these contaminants in the groundwater. During surface water runoff events, absorbed contaminants and suspended fines are transported from the residue to onsite surface water features. Within the drainage ways, the flow rate decreases, suspended fines settle and the contaminants become immobilized in the sediment.

6.5 Sediment

Sediment samples were taken as part of the RI in 2003 and the SRI in 2010. Five of the 2003 sediment sampling locations were sampled again in 2010. In general, the results were similar in both sampling events with a few exceptions. Overall, cadmium, copper, and zinc concentrations decreased, while lead and manganese concentrations increased from 2003 to 2010. The sediment analytical results were compared to ecological screening levels (ESLs). Total arsenic, cadmium, copper, lead, manganese, and zinc were observed above the ESL in the sediment located onsite and offsite.

Sediment sampling data documents that the Site-related contaminants from source areas have been transported by surface water runoff and perched water migration to drainages and then by the western drainage way to the unnamed tributary of the Middle Fork Shoal Creek, and eastern drainage way to Lake Hillsboro. This transport mechanism is most relevant to the smaller-sized residue particles because the increasing surface area of residue makes it more susceptible to erosion and transport by storm water runoff.

7.0 Current and Potential Future Site and Resource Uses

The Site has been zoned industrial/commercial by the City of Hillsboro. A Uniform Environmental Covenant on the property limits future Site use to industrial and commercial purposes. The covenant also prohibits the use of groundwater for potable purposes, and prohibits residential use and interference with EPA selected remedial actions for the Site. Local authorities have expressed significant interest in redeveloping the Site for commercial/industrial use. Land surrounding the property consists of recreational, residential, commercial, and industrial land use and such land uses are not anticipated to change.

While there are records of some older domestic wells located within a one-mile radius of the Site, all residents of Hillsboro, as well as unincorporated areas located within one mile of the Site, are provided with public water. Also, the low yield of the potentially affected shallow aquifer makes its development as a potential water source very unlikely. There is no intention to use the Site groundwater as a drinking water source and an enforceable legal control is in place to ensure the groundwater is not used as such. Currently the surface water onsite is not being used and there is no anticipated future use for surface water.

8.0 Summary of Site Risks

As part of the 2005 RI/FS, the PRP conducted a baseline risk assessment to estimate the current and future effects of contaminants on the human health and environment. A risk assessment is an analysis of the potential adverse human and ecological effects of releases to hazardous substances from a site in absence of any actions or controls to mitigate the releases, under current and future land uses. The risk assessment includes evaluation of risks to both human and ecological receptors. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. The 2012 SRI updated the previous human health risk assessment (HHRA), and re-evaluated the Screening Level Ecological Risk Assessment (SLERA), incorporating the additional data collected in the fall of 2010. This section discusses how the human health and ecological risks were evaluated at the Site for OU 2.

8.1 Human Health Risk Assessment

A four-step process is utilized for assessing Site-related human health risks for a reasonable maximum exposure (RME) scenario:

- Hazard Identification uses the analytical data collected to identify the contaminants of potential concern (COPC) at the Site.
- Exposure Assessment estimates the magnitude of actual and /or potential human exposure pathways by which humans are potentially exposed.
- Toxicity Assessment determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and adverse effects (response).
- Risk Characterization summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of Site-related risks. It also identifies contamination with concentrations that exceed acceptable levels of risk, i.e. an excess lifetime cancer risk (ELCR) greater than 1×10^{-4} or an HI greater than 1. Contaminants that exceed these criteria are considered COCs, which are typically those that will require remediation.

8.1.1 Hazard Identification

In this step, the COPCs, except lead, in each medium were identified based on the exceedances of their respective screening levels. The screening levels used in the HHRA are the regional screening level (RSL) for chemical contaminants at Superfund sites. The RSLs are based on the excess lifetime cancer risk (ELCR) of 1×10^{-6} (1 in a 1,000,000) threshold or a hazard quotient (HQ) greater than 1 for non-carcinogens. If the maximum concentration for a chemical was detected above its screening level then it was listed as a COPC. However, in the case of lead, if the average detected concentration exceeded its screening level then lead was identified as a COPC. This method is recommended by the Technical Review Workgroup for lead. The risk assessment focused on residue, soil, sediment, groundwater, and surface water. Analytical information collected revealed the presence of various metals in all media, except for the soil underneath the residue piles, at concentrations of potential concern. A comprehensive list of all COPCs can be found in Appendix H of the February 2012 RI report. This document is available in the Administrative Record File in the Site information repository.

8.1.2 Exposure Assessment

In order to facilitate risk-based decisions, OU 2 was divided into three different exposure areas: one onsite (exposure area (EA) 2) and two offsite (EAs 1 and 3). For the exposure assessment of the receptor groups, the current land use for the onsite area is vacant land (former industrial) for adolescent trespassers. For current and future exposure the land use is assumed to be industrial for industrial and construction workers. For the offsite EAs the assumed land use is residential and recreational for children and adults.

Exposure scenarios have been quantified for the adolescent trespassers, industrial workers, construction workers, and residents. Under current land use, onsite trespassers could be exposed to COPCs in residues and surface soil (0 to 2 feet bgs) through incidental ingestion, inhalation of volatile emissions and dust in ambient air, and dermal contact with soil/residue or dust where soil/residue is exposed. In the future, assuming the conditions remain the same, future onsite industrial workers could be exposed to COPCs in residue and surface soil through incidental ingestion, inhalations of volatile emissions and dust in ambient air, and dermal contact with contaminated material. Also, in the future, construction workers on the Site could be exposed to COPCs in the surface residue, and surface and subsurface soil (0 to 10 feet bgs) through incidental ingestion, inhalation, and dermal contact.

For surface water and sediment, adolescent trespassers could be exposed to COPCs through incidental ingestion and dermal contact.

Offsite, in EAs 1 and 3, the potential exposure scenarios include current and future residents exposed to COPCs in surface soil through incidental ingestion, inhalation of volatile emissions and dust in ambient air, and dermal contact with soil or dust in areas where soil is exposed. In addition, future offsite construction worker could be exposed to COPCs in the soil (0 to 10 feet bgs) via incidental ingestion, inhalation of volatile emissions and dust in ambient air, and dermal contact with soil.

Onsite ground water exposures were not evaluated in the risk assessment because the groundwater was classified as non-potable. Offsite groundwater exposures were not evaluated in the HHRA because the end users were not within a 1-mile radius of the Site. Also, the majority of residents are hooked up to the City's water supply, which prohibits cross connections with other water sources, such as private wells. Offsite adult and child recreators could be exposed to COPCs in surface water and sediment through incidental ingestion and dermal contact.

8.1.3 Toxicity Assessment

The oral and inhalation toxicity values used in the HHRA were obtained from the EPA standard hierarchy of toxicity value sources: Tier 1 Source – Integrated Risk Information System (2011); Tier 2 – EPA Provisional Preliminary Peer-Reviewed Toxicity Values (2010); and other peer-reviewed federal and state toxicity values: California EPA toxicity database (2001), EPA's

Health Effects Assessment Summary Tables (1997), and minimal risk levels identified by the Agency for Toxic Substances and Disease Registry (ATSDR) (2009).

Oral reference doses (RfDs) and inhalation reference concentrations (RfCs) were used for estimating potential adverse health effects for non-carcinogens associated with the exposure to COPCs; chronic and sub-chronic reference values were used for the evaluation. Carcinogenic toxicity values (cancer slope factor (CSF) and inhalation unit risk (IURs)) were used in evaluating potential carcinogenic effects associated with known, probable, or possible carcinogens. The CSFs and IURs were used to estimate the upper-bound lifetime statistical probabilities of a hypothetical individual developing cancer as a result of exposure to a potential carcinogen.

Oral RfDs and CSFs were converted to dermal RfDs and CSFs using a gastrointestinal absorption factor. This conversion was only done if the chemical had a gastrointestinal adsorption factor of less than 50%. If the gastrointestinal absorption factor was not available, the chemical was assumed to be absorbed at 100%. The oral RfD was used as dermal contact if the gastrointestinal absorption factor was unavailable. COPCs that act through a mutagenic mode of action for carcinogenicity were evaluated using age dependent adjustment factors for receptor groups 16 years and under.

8.1.4 Risk Characterization

Non-Carcinogenic Effects

Non-carcinogenic risks were assessed using the hazard index (HI) approach based on a comparison of expected contaminant intakes and bench mark comparison levels of intake (reference doses and reference concentrations). Reference doses (RfDs) and reference concentrations (RfCs) are estimates of daily exposure levels of humans which are thought to be safe over a lifetime of exposure. The estimated intake of chemicals identified in the environmental media is compared to the RfD or RfC to derive the hazard quotient (HQ) for the contaminant in a particular medium. The exposure concentration is divided by the Reference dose to yield the HQ. The HI is then obtained by adding the HQs for all compounds with in a particular medium that impact a particular receptor population. If the HQ for an individual contaminant exceeds 1.0, it indicates that there is a potential for adverse effects to occur. Even if all of the HQs are below one, added together the HI may exceed 1.0, indicating potential for adverse effects.

For the Site, the screening HIs were calculated by summing all the HQs for a receptor, and the final HIs were calculated for each potential receptor by target organ or system. If the final HI exceeded 1.0, then there is potential for adverse effects on that target organ or system. The final COCs were determined based on HIs greater than 1.0, see Table 1 below. Adolescent trespasser and offsite recreational user scenarios were run for this Site, there is no unacceptable risk associated with the receptors at the Site. However, there is an unacceptable risk for industrial and commercial workers since they would be exposed to higher levels more frequently than a trespasser. If a future industrial worker were to incidentally ingest a little soil and residue every day over his or her lifetime, there is a potential that the person would have adverse effects due to the high levels of antimony, zinc and lead in the residue/soil. The HI for ingestion of soil for these three contaminants is 3. Finally, for the future construction worker the total HI is 10 based on ingestion, dermal contact and inhalation of antimony, cobalt, nickel, zinc, and lead. The selected remedial action will address these unacceptable risks.

Carcinogenic Effects

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a carcinogen, using a cancer slope factor (CSF) for oral and dermal exposures. The inhalation unit risk (IUR) is used for inhalation exposures. The excess lifetime cancer risk (ELCR) is calculated by multiplying the CSF by the lifetime average daily dose (LADD): Risk = LADD x CSF. To estimate the probability of developing cancer due to exposure to two or more COPCs, the individual risk estimates are added together to present the total ELCR. The ELCRs are probabilities that are usually expressed in scientific notation. An ELCR of 1×10^{-4} means that an individual has a 1 in 10,000 chance of developing cancer as a result of Site-related exposure. An ELCR of 1×10^{-6} means that an individual has a 1 in 1,000,000 chance of developing cancer as a result of Site-related exposure. This is referred to as "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual developing cancer from all causes has been estimate to be as high as one in three. The potentially acceptable risk range according to the EPA NCP is between 1×10^{-6} to 1×10^{-4}. The receptor ELCRs ranged from 2×10^{-6} to 4×10^{-6} (see table C.4 of the HHRA) based on exposure to the soil and residue. The selected remedy will eliminate this exposure and so will address these potential risks.

Lead Approach

Quantitative toxicity values are currently not available for lead. Therefore, the risk assessment for lead was done differently than the other non-carcinogens in that it relies on blood lead levels or BLLs. BLLs for a particular site can be estimated from environmental data by modeling techniques. In order to evaluate the risks associated with the industrial and construction worker due to lead exposure in the soil, EPA used adult lead methodology (ALM). The ALM is a methodology for assessing risks associated with non-residential adult exposures to lead in soil. The methodology focuses on estimating fetal blood lead concentration in women exposed to lead contaminated soils. This approach also provides tools that can be used for evaluating risks of elevated blood lead concentrations among exposed adults. The recommended approach for assessing nonresidential adult risks utilizes a methodology to relate soil lead intake to blood lead concentrations in women of child-bearing age.

The lead models are probabilistic models and he EPA default parameters are based on central tendency, the arithmetic mean concentration of lead in the Site soil was used to represent the exposure concentrations at this Site. This concentration was as input in the model, using EPA default input model parameters. The model output provides an estimate of the percentage of the exposed population that would have blood levels that exceed EPA's "safe" level of 10 micrograms per deciliter. EPA considers exposures to be acceptable as long as no more than 5 percent of the exposed population will exceed that level. Based on the average soil concentration for lead on the surface soil (4,508 mg/kg) and total soil (3,113 mg/kg), there is an unacceptable risk to the future industrial worker and construction worker. The ALM predicted that 72.6% of the industrial worker population and 97.4% of the construction work population would have blood lead levels above 10 micrograms per deciliter. The selected remedial action will address these unacceptable risks.

8.1.5 Uncertainties

The procedures and inputs used to assess risks are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include: environmental chemistry sampling and analysis, environmental parameter measurement, fate and transport modeling, exposure parameter estimation, and toxicological data.

The upper confidence limit (UCL) concentrations were selected as the exposure concentrations if the chemical was detected in half of the data group, if the data group contained a minimum of eight samples. Eight samples is a relatively small sample size, so the calculated UCL could be less reliable. However, the potential impact this has on the HHRA is minimal.

The dermal exposure to chemicals in the soil may be underestimated because the exposure could not be quantified, due to lack of adsorption values.

The exposure assessment likely overestimates exposure for the following reasons: 1) the receptors are assumed to be exposed to the maximum detected concentration for the entire duration; 2) it was assumed that all contaminants were 100% bioavailable; and 3) the intake and exposure assessments were based on reasonable maximum exposure (RME), when in reality the maximum exposure is not likely.

In the toxicity assessment some of the toxicity values were not available for certain chemicals and chronic toxic values were unavailable for other chemicals. Therefore, the risk assessment may overestimate or underestimate the potential of non-carcinogens to lead to adverse impacts in the receptor populations.

The ATSDR suggests that the predicted directions of joint toxic action for neurological effects is greater than additive when the receptor is exposed to mixture of chemicals, specifically lead and arsenic for this Site. Therefore, the cumulative risk estimates that assume additivity may lead to an underestimation of risk due to the presence of multiple metals that may have a synergistic effect. Overall the risk assessment was conducted conservatively to assure that risks from the Site contaminants are not underestimated.

8.2 Ecological Risk

A screening level ecological risk assessment (SLERA) and a SLERA Amendment were conducted for the Site in 2005 in conjunction with the RI report to evaluate whether valuable wildlife resources may be adversely impacted by exposure to Site-related contaminants. The SLERA evaluated potential risks to aquatic, terrestrial, and avian receptors. The receptors could be in contact with contamination via ingestion, respiration, contact, and via the food web. The food web model used the deer mouse, the American robin, and red- tailed hawk. The piscivorous wildlife was evaluated based on surface water and dietary prey exposures. The SLERA was conducted in a conservative manner for each medium and wildlife combination assuming maximum exposure.

The risk, represented by the hazard quotient (HQ), was calculated by dividing the exposure estimates by conservative ecotoxicity screening values. A HQ of 1.0 or more indicates a potential for adverse impacts to wildlife. The results of the SLERA indicated that elevated HQs for the receptors of concern in the near field Western and Eastern Drainage Areas are related to locally elevated levels of zinc and cadmium in surface water and sediment.

Although the SLERA concluded there are no significant impacts to the terrestrial ecological community, there is still a significant risk to the aquatic organisms due to high levels of cadmium and zinc in the sediment and surface water. The screening level for cadmium in sediment is 0.99 parts per million (ppm) and is 121 ppm for zinc. The zinc concentrations in the sediment range from 310 ppm to 245,000 ppm, significantly above the screening criteria. The cadmium concentrations in the sediment range from 0.91 ppm to 550 ppm. These levels are also significantly above the screening levels. There are zinc and cadmium concentrations in the surface water that exceed the Illinois Administrative Code (Ill. Adm. Code) General Use Water Quality Standards– 62.8 parts per billion (ppb) and 2.61 ppb respectively. The surface water concentrations of zinc range from 155 to 1600 ppb. Cadmium detections range from 1.1 ppb to 119 ppb.

The screening values for cadmium and zinc represent Threshold Effects Concentrations (TECs). TECs are consensus-based threshold concentrations that were derived for the protection of benthic dwelling organisms[1] and represent chemical concentrations below which adverse effects to benthic-dwelling organisms are not expected. TECs were calculated by taking the geometric mean of the lowest-observed effect level and between two and five of the following values for a chemical: Threshold effect level, effects range-low, threshold effects level for *H. azteca*, Minimal effects threshold, and the chronic equilibrium partitioning threshold. The geometric

[1] MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. 2000. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. *Archives of Environmental Contamination and Toxicology* 39: 20-31.

mean of these screening values is used because it incorporates a large data set, while providing a central tendency estimate which is not unduly biased by an extreme value.

A SLERA addendum was conducted for the Site in 2005 as part of the addendum to the RI report. The addendum was conducted to address EPA concerns related to terrestrial ecological receptors and their potential exposures to constituents in onsite residue piles that may be transported away from the piles. Unlike a standard baseline risk assessment, hypothetical site data had been constructed using models. The modeled data served as inputs to the SLERA addendum. Based on the data and ecological risk information developed, it was concluded that the ecological risks to terrestrial ecological receptors are negligible and, therefore, there was no need for any further action on the basis of ecological risk to terrestrial species. However, if the habitat were to improve there would be a significant risk to those future inhabitants.

EPA compared the 2010 analytical results for surface water, sediment, soils, and residue data to the concentrations of chemicals detected in potentially Site-impacted areas during past sample events to determine if the chemical concentrations detected by the SRI data were similar to those found during previous sample events. Since the data from the previous SLERA is comparable to the data collected in 2010, the SLERA was not revised as part of the SRI. The FS and this ROD are based on the 2005 SLERA and its addendum. The remedial action will address the unacceptable risk to aquatic receptors due to the high concentrations of cadmium and zinc in the sediment and surface water.

8.3 Basis for Response Action

The Contaminants of Concern (COCs) are based on the HHRA and SLERA. The COCs were identified where the potential ELCR or hazard index (HI) for a receptor group exceeded threshold values – a total ELCR of 1×10^{-4} (1 in 10,000) or a target-organ-specific HI of 1.0. For lead, if the exposure model predicted more than 5 percent of the exposed population exceeding a blood lead level of 10 micrograms per deciliter, lead was identified as a COC for that potential receptor.

Two metals (antimony and zinc) in surface soil and residue (0 to 2 feet) are considered COCs due to their elevated non-cancer HI estimates. Further, lead was identified as a COC for surface soil and residue (0 to 2 feet). For future construction workers, the non-cancer HI estimates exceed threshold values for antimony, cobalt, nickel, zinc, and lead in soil and residue (0 to10 feet). However, the cumulative ELCR was below the acceptable the threshold value.

Cadmium and zinc were identified as COCs for surface water and sediment based on the SLERA concluding a risk to aquatic organisms from these two metals. The COCs for this Site are provided in Table 1 below.

Table 1: Contaminants of Concern

Medium	COCs
Residue	Lead, Zinc, Cobalt, Nickel, and Antimony
Surface Water and Sediment	Cadmium and Zinc

High metal concentrations (lead, zinc, cadmium, etc.) in the residue, sediment, and surface water at the Site present unacceptable risks to future commercial/industrial workers and construction workers, and have the potential to cause adverse effects to the aquatic receptors onsite and offsite. Therefore, based on the results of the human health and ecological risk assessments, the response action selected in the ROD is necessary to protect public health and the environment from actual or threatened releases of hazardous substances into the environment.

9.0 Remedial Action Objectives and Cleanup levels

Remedial Action Objectives (RAOs) are statements that specify contaminant type and media of concern, potential exposure pathways, and remediation goals. RAOs have been developed for the Site for the protection of human health and environment based on the findings in the RI. The RAOs are based on the Cleanup Levels (CLs) which are based on RSLs, an HI of 1, reasonably anticipated future resource uses, and ARARs. The RAOs are categorized by media and exposure pathways and are listed in Table 2 below:

Table 2: Remedial Action Objectives

Media	Remedial Action Objective(s)
Residue and Soil	• Prevent exposure to industrial and construction workers from COC concentrations in residue and soil immediately underlying the residue that exceed the cleanup levels (CLs). • Prevent residue erosion of COCs into the surrounding water bodies so that CLs are not exceeded in those water bodies or the sediment. • Minimize leaching of COCs into the groundwater or perched water that discharges into surrounding water bodies in order to prevent unacceptable risk to aquatic receptors.
Surface Water	• Minimize the discharge of COCs exceeding the CL into the surrounding water bodies.
Surface Water and Sediment	• Prevent unacceptable risk to the aquatic receptors from COCs that exceed the CL in surface water and/or sediment within a reasonable timeframe.

The CLs were developed considering the risk-based concentrations corresponding to an HI of 1 or a significant ecological risk, contaminant specific applicable or relevant and appropriate requirements (ARARs), and background concentrations for specific contaminants. The CLs for the Site are provided in the Table 3 below. The CLs are the cleanup goals for this Site.

Table 3: Cleanup levels

Media	Contaminant of Concern	Cleanup Level (CL)	Basis for CL
Residue/Soil	Lead	700 ppm	**Illinois Tiered Approach to Corrective Action Objectives (TACO)**
	Zinc	61,000 ppm	
	Cobalt	12,000 ppm	
	Nickel	4,100 ppm	
	Antimony	82 ppm	
Surface Water	Cadmium	2.61 ppb	**Illinois EPA General Use Surface Water Standards**
	Zinc	62.8 ppb	
Sediment	Cadmium	1 ppb	**Ecological Screening Levels**
	Zinc	121 ppb	

10.0 <u>Description of Alternatives</u>

CERCLA Section 121 mandates that remedial actions must be protective of human health and the environment, cost-effective, comply with ARARs (unless a waiver is invoked), and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. CERCLA Section 121(b)(1) also establishes a preference for remedial actions that employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants. A detailed description of the remedial alternatives for addressing the Site contamination can be found in the Feasibility Study report (May 2012). The alternatives were developed and evaluated based on the environmental media in which contamination was found.

The construction time for each alternative reflects only the time required to construct or implement the remedy and does not include the time required to procure contracts for design and construction.

The cost estimates include the cost to implement the remedial action (capital costs), the annual O&M cost over thirty years, periodic costs for five year reviews over thirty years and the present value cost estimate factors in a 2% discount rate. The cost to design the remedial action is not included in these estimates. A more detailed explanation of the cost estimates can be found in the May 2012 Feasibility Study.

10.1 Alternative 1 - No Action

Capital Costs	$0
Annual O&M Costs	$0
Periodic Costs (30 years)	$90,000
Total Present Value	**$100,000**

Alternative 1 provides a baseline for evaluation of the proposed remedial alternatives, as required by the NCP. Under this alternative, no remedial actions would be conducted at the Site. Direct contact with residue and soil would be a risk to industrial and construction workers. Groundwater and surface water would continue to exceed CLs as a result of contaminants leaching to water perched in residue and impacted groundwater perched in residue discharging to water drainage systems. Sediment and surface water would remain a potential risk to ecological receptors. This remedy would take no time to complete and would cost nearly $100,000 to monitor it over thirty years as part of required five-year reviews. Since contamination will be left in place above levels that allow for unrestricted use and unlimited exposure, five-year reviews would be required.

10.2 Alternative 2 – Immobilization and Ill. Adm. Code 807 Compliant Soil Cover

Capital Costs	$12,900,000
Annual O&M Costs	$3,582,000
Periodic Costs (30 years)	$90,000
Total Present Value	**$15,600,000**

***Immobilization of Residue Piles NP-14, RR1-3, and MP1-21*:** Residue piles, which exhibit the characteristic of leachability (NP-14, RR1-3, and MP1-21) would be consolidated into one designated area and treated in-situ using immobilizing agents to meet the SPLP, as well as, TCLP-based CLs for cadmium, lead, and zinc. The treated residue piles would then be consolidated and covered with soil as described below. Immobilization is possible with agents such as phosphate, sulfide, or cement-based agents. The exact immobilizing agent will be determined in the design phase. The immobilization mix will be chosen based on cost effectiveness and ability to prevent leaching. The estimated volume to be treated is 2,100 cubic yards.

Consolidation, Grading, and Cover of Residue Material Exceeding the CL: Loose residue and residue piles that exceed the CLs would be consolidated within the southern portion of the existing residue boundary, graded, and covered with clay and topsoil. The future temporary demolition management cell containing OU 1 demolition debris would also be dismantled and incorporated into the residue area to be covered, estimated to be approximately 18 acres. The volume of residue outside the cover area to be consolidated is estimated to be 191,000 cubic yards. The volume of surface soil outside the cover area to be consolidated and covered is estimated to be 62,220 cubic yards. The specific dimension of the consolidation cover area will be developed during the design phase the location and configuration will be consistent with future development.

The area chosen for consolidation placement of residue would first be cleared, grubbed, and regraded to the required design slopes. The final slopes of the soil cover would be designed to control runoff while minimizing the potential for erosion and infiltration. The residue would be covered with soil cover that complies with Ill. Adm. Code 807 consisting of a compacted layer of no less than 24 inches of suitable material. A six-inch vegetative soil cover would be added to protect the compacted layer and to contribute to the controlled surface water drainage system. The surface water drainage system is expected to keep flow away from the consolidated area which would minimize leaching and subsequent contamination of the perched water, surface water, and sediment. By reducing the flow of water through the residue, the cover should result in a rapid reduction of COC concentrations in the perched water and the surface water.

In addition, because the soil cover over the residue will prevent erosion of contaminated residue into the onsite ponds and provide for deposition of uncontaminated sediment over the existing sediment, exposure to contamination in those ponds will be decreased, and contamination levels will naturally attenuate. Sediment levels would be monitored to verify these results.

Institutional Controls: A Restrictive Covenant was placed on the Site in November, 2011. The covenant provides notice to future property owners that the contamination at the Site poses risks to human health and the environment. The Covenant restricts the use of groundwater and prevents disturbance of the remedy. The Covenant also prohibits residential use of the property, including homes, hospitals, and schools. These land-use restrictions must be maintained through future property transfers and acquisitions.

Monitoring and Assessment: Groundwater, surface water, and sediment would be monitored using eight different monitoring wells and five sediment/surface water locations. For two years after the implementation of the remedy the Site will be sampled quarterly. The results will be evaluated and compared against the CLs. The monitoring will be reduced to semi-annual events depending on trends observed in the analytical results. A report would be prepared annually to document the analytical results, site inspections and trend analysis, and recommendations for the Site-specific monitoring program.

This remedy would take three months to complete and would cost $15.6 million. Since contamination will be left in place above levels that allow for unrestricted use and unlimited exposure five-year reviews would be required.

10.3 Alternative 3 – Immobilization, Ill. Adm. Code 807 Compliant Soil Cover, and Stream Re-alignment

Capital Costs	$15,600,000
O&M Costs (30 years)	$3,836,500
Periodic Costs (30 years)	$90,000
Total Present Value	**$18,711,000**

Immobilization of Residue Piles NP-14, RR1-3, and MP1-21: Alternative 3 immobilization of residue piles would be the same as Alternative 2.

Consolidation, Grading, and 807 Cap over Residue Piles: Alternative 3 consolidation and cover of residue and soil exceeding the CLs would be the same as Alternative 2; however, the area to be covered would be larger, approximately 22 acres, and the southwestern pond would be filled in with the residue material. The volume of residue outside the cover area to be consolidated is estimated to be 168,000 cubic yards. The volume of surface soil outside the cover area to be consolidated and covered is estimated to be 58,000 cubic yards.

Stream Re-alignment, Sediment Excavation, and Onsite Consolidation: The westward flowing ephemeral stream that originates in the center of the Site and flows toward the southwestern corner of the Site would be realigned to reduce surface water interaction with the existing residue and to return the ephemeral stream to its natural flow pattern. The new stream length is assumed to be 3,200 linear feet with dimensions of 8 feet wide and 1 foot deep. The wetland along the stream would be excavated to accommodate the re-alignment. A new wetland footprint would be constructed to retain some of the wetland functions and the ecological habitat, and to increase the area's water storage capacity during large storm events. Sediment from the former stream bed above CLs would be excavated, as needed, and consolidated with the residue underneath the cover. The existing surface water pond, stream, and wetland would be filled with soil excavated from the construction of the new stream channel and wetland. These areas will be stabilized with native seed and native riparian trees and shrubs.

Contaminated sediment from the ditch and stream located along the southern perimeter of the Site, the two small onsite ponds, and the offsite tributary to the northeastern stream system that drains toward Lake Hillsboro would be remediated by excavation and onsite disposal under the soil cover. The banks of this 830-linear-foot offsite reach would be restored using typical bioengineering bank stabilization techniques.

Institutional Controls: Alternative 3 institutional controls would be the same as Alternative 2.

***Monitoring and Assessment*:** Alternative 3 monitoring and assessment would be the same as Alternative 2, except that the sediment would not be monitored since it would be actively remediated to meet CLs under Alternative 3.

This remedy would take five months to complete and would cost $18.7 million. Since contamination will be left in place above levels that allow for unrestricted use and unlimited exposure, five-year reviews would be required.

10. 4 Alternative 4 – Immobilization, Ill. Adm. Code 811 Compliant Cap, and Stream Re-alignment

Capital Costs	$20,100,000
O&M Costs (30 years)	$3,840,000
Periodic Costs (30 years)	$90,000
Total Present Value	**$24,500,000**

Onsite Immobilization of Residue Piles NP-14, RR1-3, and MP1-21: Alternative 4 immobilization of residue piles would be the same as Alternative 2.

Consolidation, Grading, and 811 Cap over Residue Piles: The Alternative 4 consolidation is the same as that for Alternative 3. Alternative 4 has an Ill. Adm. Code 811 cap instead of an Ill. Adm. Code 807 soil cover. The specific cap configuration would be selected in the design, but for cost estimating purposes it is assumed that the cap would include: six inches of topsoil (with vegetation), 3 feet of soil for freeze-thaw protection, double-sided geocomposite, 40-mil linear low density polyethylene geomembrane, and two feet of low-permeability clay or a geosynthetic clay liner.

Stream Re-alignment, Sediment Excavation, and Onsite Consolidation: Alternative 4 stream re-alignment, sediment excavation, and onsite consolidation would be the same as that for Alternative 3.

Institutional Controls: Alternative 4 institutional controls would be the same as Alternatives 2 and 3.

Monitoring and Assessment: Alternative 4 monitoring and assessment would be the same as Alternative 3.

This remedy would take 5 months to complete and cost $24.5 million. Since contamination will be left in place above levels that allow for unrestricted use and unlimited exposure, five-year reviews will be required.

11.0 **Comparative Analysis of Alternatives**

Section 121(b)(1) of CERCLA presents several factors that, at a minimum, EPA is required to consider in selection of a remedial action. Building upon these specific statutory mandates, the NCP articulates nine evaluation criteria to be used to assess the individual remedial alternatives. The purpose of this evaluation is to promote consistent identification of the relative advantages and disadvantages of each alternative, thereby guiding the selection of remedies offering the most effective and efficient means of achieving Site cleanup goals. While all nine criteria are important, they are weighed differently in the decision-making process depending on whether they evaluate protection of human health and the environment or compliance with federal and state requirements, standards, criteria, and limitations (threshold criteria); consider technical or economic merits (primary balancing criteria); or involve the evaluation of non-EPA reviewers that may influence a EPA decision (modifying criteria). The evaluation criteria are described below:

Overall protection of human health and the environment refers to whether a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, and/or ICs.

Compliance with ARARs refers to whether a remedy would meet all of the applicable or relevant and appropriate requirements (ARARs) of other Federal and State environmental statutes and requirements or provide grounds for a waiver.

Long-term effectiveness refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the expected residual risk posed by treatment residuals and/or untreated wastes.

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies, with respect to these parameters, that a remedy may employ.

Short-term effectiveness refers to the period needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

Implementability refers to the technical and administrative feasibility of a remedy from design through construction and operation, including the availability of materials and services needed to implement a particular option.

Cost includes estimated capital and O&M costs, and net present-worth costs.

State acceptance indicates if, based on its review of the RI and the FS, and Proposed Plan, the State concurs with the preferred remedy.

Community acceptance is assessed in the ROD and refers to the public's general response to the alternatives described in the Proposed Plan, the RI, and the FS.

11.1 Overall Protection of Human Health and the Environment

The "No Action" Alternative is not protective of human health and the environment compared to other alternatives; therefore, it will not be evaluated further.

Alternatives 2, 3, and 4 are protective because they address the human health and environmental Site risks through treatment of soil contaminants, engineering controls, and institutional controls. Alternatives 2 and 3 will minimize the potential migration of cadmium and zinc from the residue to the surface water in the western drainage area. Alternative 4 adds further protection by preventing virtually all infiltration through the residue and contamination of surface water in the western drainage area. Also, Alternatives 2, 3, and 4 immobilize the RCRA hazardous waste residual material prior to placing it under the soil cover or cap, preventing these leachable materials from migrating into surface water or to the groundwater. Alternatives 2, 3 and 4 eliminate potential direct contact exposures that present unacceptable risks. Alternatives 3 and 4 provide additional protection to ecological receptors by eliminating exposures to contaminated sediments.

11.2 Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Section 121(d) of CERCLA and the NCP §300.430(f)(1)(ii)(B) require that remedial actions at Superfund sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4).

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstances found at a Superfund site. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that, while not "applicable" to circumstances at a Superfund site, address problems or situations sufficiently similar to those encountered at the Superfund site that their use is well-suited to the particular site. Only those State standards that are identified in a timely manner and are more stringent than federal requirements are ARARs.

Alternatives 2, 3, and 4 comply with ARARs. There are many ARARs common to the proposed alternatives. Action-specific ARARs include the RCRA regulations for management, treatment and disposal of hazardous waste and the Illinois Solid Waste Regulations in Ill. Adm. Code Title 35 Subtitle G and 40 CFR 262, 265, and 268. Many of these regulations are relevant and appropriate to the in-situ treatment of the hazardous residue and cover components of the proposed remedy. While the Ill. Adm. Code 811 landfill cover requirements are also relevant, the Ill. Adm. Code 807 landfill cover requirements appear to be more appropriate. The Ill. Adm. Code 807 cover is designed to minimize leachate and infiltration. The additional prevention of infiltration provided by the Ill. Adm. Code 811 cover in Alternative 4 does not appear to be necessary when the most leachable material under the cover is already immobilized through treatment so that the potential impact of the residue on groundwater and surface water is already limited.

The most significant location specific ARARs for the Eagle Zinc Site are as follows: The Fish and Wildlife Coordination Act protects fish and wildlife when actions modify the control or structure of a natural stream or body of water. The Illinois Department of Natural Resources regulates certain construction activities in the floodways of streams in the urban areas where the stream drainage is one square mile or more. Section 404 of the Clean Water Act establishes standards for activities that would destroy or degrade wetlands, and protocols for mitigation of the lost wetland habitat required for the stream re-alignment component of Alternatives 3 and 4.

11.3 Long-Term Effectiveness and Permanence

Alternatives 2 through 4 have varying levels of long-term effectiveness and permanence. All of these alternatives stabilize the residue materials that would otherwise be most likely to leach contamination into the environment. Alternative 2 is the least effective and permanent because sediment contamination would remain in place. Alternative 3 is more permanent and effective than Alternative 2 because it removes sediment contamination and places it under a two-foot thick low-permeability cover meeting the requirements of Ill.Adm. Code 807. The Alternative 4 cover provides more long-term effectiveness than the cover used in Alternatives 2 and 3 because it meets Ill. Adm. Code 811 requirements, resulting in a more impermeable cover than the cover used in Alternatives 2 and 3. Alternatives 2, 3 and 4 all require monitoring and maintenance of the cover to assure long-term effectiveness. Enforceable institutional controls are required for all three alternatives. Reviews at least every five years, as required, would be necessary to evaluate the effectiveness of any of these alternatives because hazardous substances would remain onsite in concentrations above health-based levels.

11.4 Reduction in Toxicity, Mobility, and Volume Through Treatment

Alternatives 2, 3, and 4 include treatment to reduce the leaching of metals in approximately 2,100 cubic yards of residue. Each alternative would use similar immobilization agents to reduce the toxicity and mobility of cadmium, lead, manganese, copper and zinc in the residue, preventing contaminants from leaching and migrating to perched water, surface water, or sediments.

11.5 Short-Term Effectiveness

Alternatives 2, 3, and 4 would have minimal impact with respect to the protection of workers, the community, or the environment during the remedial construction as long as adequate monitoring is conducted and mitigative actions are taken. There would be potential risks to construction workers during excavation and treatment of soils and construction of the cap in these alternatives, primarily associated with equipment movement and exposure to contaminated dust. Onsite and Site boundary air monitoring and engineering controls would control the potential for exposure. Proper health and safety protection for workers, dust control, and erosion control would be adhered to during the construction of the remedy.

Alternatives 3 and 4 are more likely to impact construction workers because these alternatives require more excavation than Alternative 2. These alternatives also have some adverse impacts to the ecological habitat in the short-term because they require re-alignment of the stream and wetland area and the filling of the pond. The stream will be re-aligned in an uncontaminated area and a new wetland area will be created.

Alternatives 2, 3, and 4 will take only three to five months to construct and the short-term adverse impacts will be limited to implementation time. Alternatives 3 and 4 would take five months to implement, Alternative 2 would take three months to implement.

11.6 Implementability

Alternatives 3 and 4 would be more difficult to implement than Alternative 2. The main technical challenge is the steep topography that would be encountered with the stream re-alignment. All three alternatives, however, make use of common and readily implemented treatment and remedy construction elements. Necessary equipment and materials are readily available for these alternatives.

11.7 Cost

Alternative 2 is the lowest cost protective alternative, with a present worth of $15,500,000. Alternative 3 is the next least costly alternative with a present worth of $18,700,000. Alternative 4 is the significantly more costly than the other two alternatives with a present worth of $24,700,000. See Table 4 for a comparison of the costs.

Table 4: Alternative Cost Comparison

Alternative	Cost
Alternative 1 – No Action	$100,000
Alternative 2 – Immobilization and 807 cap	$15,600,000
Alternative 3 – Immobilization, 807 cap, and Stream Re-alignment	$18,711,000
Alternative 4 – Immobilization, 811 cap, and Stream Re-alignment	$24,500,000

11.8 State Acceptance

Illinois EPA has verbally expressed their concurrence on the selected remedy. The letter documenting their concurrence will be added to the Administrative Record upon receipt.

11.9 Community Acceptance

The comments received during the comment period generally reflect support for the selected remedy. In general, the community commented that the selected remedy should manage all the residue material and control dust during the remedial action. The community wants the vegetative cover to use native grasses; and they want EPA to use local contractors for the remedial action. More immediate requests for action include the implementation of a more comprehensive fence and extra signage around the Site. Responses to comments received during the public comment period are included in the Responsiveness Summary.

12.0 Principal Threat Wastes

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP Section 300.430 (a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is a material that includes or contains hazardous substances, pollutants or contaminants that 1) act as a reservoir for the migration of contamination of groundwater, surface water or air; or 2) act as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile and cannot be reliably contained, or would present a significant risk to human health and the environment should exposure occur.

The Site consists of both principal threat waste and low level threat waste. The principal threat wastes at the Site are the residue piles that are RCRA hazardous waste. Waste piles, NP-14, RR1-3, and MP1-21 are considered characteristically hazardous because they failed the TCLP analysis, indicating a high probability for the contamination to leach into groundwater and migrate offsite. The selected remedy will treat the principal threat waste at the Site by immobilizing the residue in these piles to prevent leaching and migration of Site-related contaminants, namely cadmium, lead, and zinc. The low level threat waste is the rest of the residue onsite that exceeds the RSL. This waste is not highly mobile because it is not leachable.

The low level threat waste will not be treated or removed because it can easily be contained onsite.

13.0 <u>Selected Remedy</u>

13.1 Summary of Rationale for the Selected Remedy

All of the proposed alternatives, except the "No Action" Alternative, are protective and meet ARARs. They also employ treatment to reduce toxicity, mobility, or volume of hazardous substances. All of the alternatives are readily implementable although Alternatives 3 and 4 are somewhat more difficult to implement than Alternative 2. All the alternatives have manageable short-term impacts. Although Alternative 4 is the most long-term effective alternative, the additional protectiveness provided by the impermeable cover in Alternative 4 is not necessary or cost-effective; the leachable materials under the cover will have already been treated so that additional protection from infiltration is not needed. Aside from Alternative 1 (the "no action" alternative), Alternative 2 is the least protective because it does not remove contaminated sediment or re-align the water flow around the contaminated waste material. Alternative 3 is the preferred alternative because it provides sufficient protection and mitigates the potential contaminant transport in the most cost-effective manner.

Figure 2 Selected Remedy Concept Map

13.2 Description of Remedial Components

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and public comment, EPA, in conjunction with the State of Illinois, has determined the Alternative 3 would best satisfy the requirements of CERCLA 121, 42 U.S.C. Section 9621 and would provide the best balance of tradeoffs among the remedial alternatives with respect to the NCP's nine evaluation criteria, 40 CFR Section 300.430(e)(9).

The selected remedy for OU 2 consists of the following:

Hazardous Waste Treatment: About 2,100 cubic yards of residue piles, which exhibit the characteristic of leachability (NP-14, RR1-3, and MPI – 21) will be consolidated into one designated area and treated in-situ using immobilizing agents to meet the SPLP and TCLP based treatment standards for cadmium, lead, and zinc. The treatment will eliminate the characteristic of leachability for this material. The immobilization mix will be chosen during the remedial design process based on cost-effectiveness and ability to prevent leaching.

Onsite Consolidation and Containment: All residue material above CLs, including the treated material, soils, excavated sediments, and stockpiled demolition materials from OU 1 will be consolidated in an approximate 22 acre area. The consolidated material will be covered with a soil cover that complies with Ill. Adm. Code 807, consisting of a compacted layer of no less than 24 inches of suitable material. A six-inch vegetative soil cover will protect the compacted layer and contribute to the controlled surface water drainage system. Native grasses will be incorporated into the cover as part of the design to the extent feasible. The surface water drainage system is expected to keep flow away from the consolidated area which will minimize leaching and subsequent contamination of the perched water, surface water, and sediment. The southwestern pond located in the consolidation area will be filled in with the consolidated materials.

Stream Re-alignment, Sediment Excavation, and Wetland: The westward flowing ephemeral stream will be realigned to reduce surface water interaction with the existing residue and to return the ephemeral stream to its natural flow pattern. The new stream length is assumed to be 3,200 linear feet with dimensions of 8 feet wide and 1 foot deep. The wetland along the stream will be excavated to accommodate the re-alignment and a new wetland footprint will be constructed. Sediment from the former stream bed above CLs will be excavated, as needed, and consolidated with the residue underneath the cover. These areas will be stabilized with native seed and native riparian trees and shrubs. Contaminated sediment from the ditch and stream located along the southern perimeter of the Site, the onsite ponds, and the offsite tributary to the northeastern stream system that drains toward Lake Hillsboro will be excavated and disposed of onsite under the soil cover.

Institutional Controls: A Restrictive Covenant was implemented on the property in November, 2011. The Covenant provides notice to future property owners that the contamination at the Site poses risks to human health and the environment. The Covenant restricts potable use of groundwater and prevents disturbance of the remedy. The Covenant also prohibits residential use of the property, including homes, hospitals, and schools. These land-use restrictions are maintained through future property transfers and acquisitions. Under Illinois' Uniform Environmental Covenants Act, EPA may enforce these use restrictions against current and future owners of the property.

Monitoring and Assessment: There is some contamination in the onsite groundwater but the hydraulic conductivity onsite is too low to produce sufficient water for potable use. EPA does not expect that drinking water wells will be used onsite in the future. The groundwater will not be actively remediated. The treatment and containment remedial measures are expected to effectively address the source of groundwater contamination. EPA will continue to monitor the groundwater and surface water quarterly, providing annual reports that will document the analytical results, site inspections, trend analyses. As needed there will be recommendations for the Site-specific monitoring program. If groundwater conditions change, appropriate steps will be taken to address any acceptable risk or impairment to beneficial use.

In accordance with EPA Region 5 Greener Cleanup Policy and in order to maximize the net environmental benefits, EPA will evaluate the use of sustainable technologies and practices, as appropriate, during design, construction, and operation of the selected remedy.

13.3 Summary of Estimated Remedial Costs

A detailed cost estimate is provided in Table 5. The information in the cost estimate summary table is based on the best available information regarding the anticipated scope of the remedial alternative. This cost estimate does not include the cost of the remedial design. This is an order-of-magnitude engineering cost estimate that is expected to be within +50% to -30% of the actual project costs. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering pre-design and design of the selected remedy.

Major cost changes may be documented in the form of a memorandum in the Administrative Record file, an Explanation of Significant Differences (ESD), or a ROD amendment.

Table 5. Selected Remedial Action Cost Estimate

Task	Cost	
Institutional Control Plan	$	15,000.00
Pre-Design Studies	$	33,000.00
Site Preparation	$	447,864.00
Immobilization of Residue	$	122,753.00
Excavation and Consolidation of Residue	$	4,051,488.00
22-acre Cover Construction	$	2,782,234.00
Stream Re-alignment and Wetland	$	1,526,640.00

Fencing	$	178,680.00
Third Party Oversight (soil testing lab/field)	$	45,500.00
Verification Sampling	$	155,600.00
Contingency (25%)	$	2,345,000.00
Project Management (6%)	$	666,918.00
Construction Management (6%)	$	800,302.00
Prime Contractor Oversight (17.2%)	$	1,613,360.00
Total Capital Cost	**$**	**14,784,339.00**
Annual O&M (30 Years)	$	3,836,452.00
Five Year Reviews (30 Years)	$	90,000.00
Total Present Value (rounded up)	**$**	**18,711,000.00**

13.4 Expected Outcome(s) of the Selected Remedy

The selected remedy is expected to: prevent exposure to future industrial and construction workers to COCs in the residue, soil, and groundwater; minimize leaching of COCs into the groundwater; minimize discharge of contaminated surface and groundwater into the Site's water bodies; and prevent unacceptable risk to the aquatic receptors. It is expected that the cleanup levels (CLs), presented in Table 2, will be met in response to the implementation of the selected remedial action. The CLs for the residue and soil COCs are the Illinois Tiered Approach to Corrective Action Objects (TACO), which are protective of both future industrial and construction workers. The CLs are as follows: lead (700 ppm), zinc (61,000 ppm), cobalt (12,000 ppm), nickel (4,100 ppm), and antimony (82 ppm). The CL for the surface water COCs are the Illinois EPA General Use Surface Water Standards – for cadmium the CL is 2.61 parts per billion (ppb) and for zinc the CL is 62.8 ppb. The CLs for the sediment are the Ecological Screening Levels, intended to protect the benthic community. The CL for zinc is 121 ppm and for cadmium the CL is 1 ppm.

The selected remedy is also expected to make approximately 110 acres or about 75% of the Site available for industrial and commercial reuse. This will allow the community to implement its economic growth strategies in this area soon after construction is complete. The cleanup and reuse of the property will likely increase city tax revenue, increase property value, and create jobs for the community. Any re-use will be subject to the environmental covenant, to assure that the remedy elements, particularly the cover and the wetlands, are not disrupted.

The contaminated groundwater is not in an aquifer that would yield sufficient groundwater to source a drinking water well, so it is not expected that contaminated groundwater would be used. The selected remedy anticipates that contamination levels in groundwater and surface water would reach acceptable levels over time.

14.0 Statutory Determinations

Under CERCLA Section 121 and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with applicable or relevant and appropriate requirements (ARARs) for this remedial action (or invoke an appropriate waiver), are cost-effective, and utilize permanent solutions and alternative treatment technologies (or resource recovery technologies) to the extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as a principal element and a bias against offsite disposal of untreated wastes. The following sections discuss how the selected remedy meets these statutory requirements.

14.1 Protection of Human Health and the Environment

The selected remedy for OU 2 will be protective of human health and environment. The implementation of the selected remedy may pose some short-term risks. Once implemented, the selected remedy will; through treatment, containment and natural recovery - minimize the exposure to human and ecological receptors to Site-related contamination above CLs.

14.2 Compliance with Applicable or Relevant and Appropriate Requirements

The selected remedy complies with the Site-related applicable or relevant and appropriate requirements (ARARs). Chemical-specific, location-specific and action-specific ARARs are included as Attachment 2.

The main chemical-specific ARARs for the residual material and the associated soil are the treatment requirements for leachable materials in 40 CFR Part 268 and 35 Ill. Adm. Code Part 728.

The main action-specific ARARs are the RCRA regulations for management, treatment and disposal of hazardous waste and the Illinois Solid Waste Regulations in Ill. Adm. Code Title 35 Subtitle G and 40 CFR Parts 262 and 265.

The primary location-specific ARARs for the Site are as follows. The Fish and Wildlife Coordination Act protects fish and wildlife when actions modify the control or structure of a natural stream or body of water. The Illinois Department of Natural Resources regulates certain construction activities in the floodways of streams in the urban areas where the stream drainage is 1 square mile or more. Section 404 of the Clean Water Act establishes standards for activities that would destroy or degrade wetlands, and protocols for mitigation of the lost wetland habitat required for the stream re-alignment component. These regulations apply to the stream re-alignment and pond filling component of the selected remedy.

14.3 Cost- Effectiveness

The selected remedy is cost-effective and represents a reasonable level of protectiveness and value for the money to be spent. In making this determination the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness." (NCP Section 300.430(f)(1)(ii)(D)). "Overall effectiveness" of the alternatives that satisfy the threshold criteria, (i.e., protective of human health and the environment and comply with ARARs) was evaluated by assessing three of the five balancing criteria (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness. The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs and hence this alternative represents a reasonable level of protectiveness for the money spent. The estimated present worth cost of the selected remedy is $18,711,000. Although Alternative 2 cost roughly $3 million less, it did not address potential ecological risks presented by contaminated sediments and did not optimize surface water flows to minimize potential future migration of contaminants. For an additional $6 million, Alternative 4 adds a more impermeable cover for further protection against infiltration into the contaminated residue. However, the most mobile contaminants will have already been addressed through treatment, so the less permeable cover is not considered to be cost-effective.

14.4 Utilization of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practicable

EPA has determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Site. The selected remedy is a permanent solution to address the unacceptable risks posed by the COCs. In addition to covering the solid waste materials to prevent exposure, the selected remedy employs treatment of hazardous waste material to prevent future migration of contaminants. The selected remedy does not present short-term risks significantly different from the other treatment alternatives. There are no implementability issues that set the selected remedy apart from any of the other alternatives evaluated.

14.5 Preference for Treatment as Principal Element

The selected remedy satisfies the preference for treatment as a principal element by treating the principal threat wastes at the Site. The residue piles NP-14, RR1-3, and MP1-21, which are characteristically hazardous, will be treated with an immobilizing agent to prevent the leaching of metals. Approximately 2,100 cubic yards of hazardous waste will be treated prior to disposing of it onsite under limited-permeability cover complying with the requirements of 35 Il. Adm. Code Part 807.

14.6 Five-Year Review Requirements

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining onsite above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment. Subsequent five year reviews will take place every five years after the first review, in perpetuity or until all contamination is removed from the Site. These reviews are required pursuant to CERCLA §121(c) and NCP §300.430(f)(4)(ii).

15.0 Documentation of Significant Changes

The Proposed Plan for OU 2 of the Site was released for public comment on May 30, 2012. The Plan identified Alternative 3 as the preferred alternative for the Site. EPA reviewed all written and verbal comments submitted during the public comment period. Responses to these public comments are addressed in the following section of this report. It was determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

PART III: RESPONSIVENESS SUMMARY

In accordance with CERCLA Section 17, 42 U.S.C. Section 9617, the EPA established a public comment period from May 30 to June 30, 2012, to allow interested parties to comment on the Proposed Plan for the Site. The Proposed Plan identified the cleanup alternatives and preferred options for the final remedy for OU 2 of the Eagle Zinc Site in Hillsboro, Illinois. The Proposed Plan was issued by EPA, the lead agency. EPA, in consultation with Illinois EPA, has selected a final remedy for the Site now that the public comment period has ended, and written and oral comments have been submitted and considered.

The purpose of this Responsiveness Summary is to document the Agency's responses to questions, concerns, and comments received during the comment period and during the public hearing. These comments and concerns were considered prior to selection of the final remedial action at the Site. A complete copy of the Proposed Plan, Administrative Record (AR), and other pertinent information are available at the Hillsboro Public Library (217-532-3055), 214 School Street, Hillsboro, IL 60249. The AR is also available in the Region 5 Records Center, 77. West Jackson Blvd, Chicago, IL 60604.

EPA received 14 comments from eight different people on the Proposed Plan. Some of the comments will be paraphrased for the purposes of the Responsiveness Summary. The actual comments were placed in the Administrative Record and are available for public view.

Stakeholder Issues and Lead Agency Responses

Comment 1: I am a licensed asbestos worker. I was born and raised in Hillsboro. I would like this local work. I think the work should go to the local people. This comment was from a Union Asbestos Worker Local 207.

Comment 2: I live in Hillsboro and I also do environmental consulting work. Will this project be bid through the FedBizOpps website? I work for a small company. We do construction materials testing, geotechnical engineering, environmental consulting, environmental remediation, wetlands work, and also archaeology. This project will likely be too large for us to pursue as the lead. What would be the best way for us to get involved with this project?

Responses 1 and 2: Contractors interested in bidding for work should continue to monitor the Site's progress online. When the remedial activities receive funding, EPA will select a prime contractor who will then bid out the subcontracts. Interested contractors should send their Statement of Qualifications to the EPA's prime contractor. The contractor's information will be added to the list and they will be sent a Request for Proposal along with the other contractors on the list of potential contractors. Contractors must meet the federal contracting requirements.

Comment 3: There are no warning signs on the property to let people know that the Site is dangerous. There are many homes with small children who can access the property. Please don't let someone get hurt because there are virtually no barriers or warnings.

Response 3: In 2009 EPA installed a fence around the most accessible areas of the property to prevent people from driving on to the property and removing things from the buildings. There are at least three signs on the fence that indicate that the Site is a Superfund site. At the time of this comment, there were no signs that say "Danger" or "Warning". EPA subsequently put up signs and extended the fence in July 2012 in response to this community comment.

Comment 4: Any part of the remediation process that involves capping wastes should include planting native grasses and wildlife friendly vegetation on top of the cap.

Response 4: EPA agrees that native grasses should be used for the vegetation over the cover. Native grasses will be used to the extent possible while still meeting the remedial action objectives. This will be specified in the remedial design.

Comment 5: On the 132-acre Site is a nice stand of Indian grass and several species of native sedges (Carex spp.), all uncommon native prairie grasses in Montgomery County. This stand is an original Montgomery County ecotype. The seeds could be collected and used in restoration projects—once the clean-up is complete, provided the stand is not destroyed during the clean-up. So I would ask that you cordon off this area of native grasses to keep it from being destroyed. Also, would it be possible to get permission from EPA to conduct a controlled burn on this Site, which is located on the north end of the property adjacent to Smith Road?

Response 5: EPA will inform the design contractor of the area you wish to have protected. However, if this area has contaminated materials in it, it cannot be preserved. The vegetation cover will use native grasses as requested to the extent possible while still meeting the remedial objectives of the cover. Permission to do a controlled burn would come from the City of Hillsboro and T.L. Diamond, the property owner. If approved by these parties EPA, in consultation with Illinois EPA, would need to evaluate if it is appropriate to conduct a controlled burn give then Site contamination.

Comment 6: I think that option 2 is the best choice for cleanup. Doing nothing should not be an option. We drive by there every day. It is not only an eyesore, but it may pose health problems to us living nearby if the cleanup is not dealt with properly.

Response 6: Evaluation of the No Action option is mandatory and is used as a baseline for purposes of comparing the cleanup options. Option 2 is a protective option and is relatively cost effective; however it does not remove the sediment contamination from the Site, which could take decades to recover by itself. EPA will ensure that the cleanup is conducted properly.

Comment 7: It doesn't make any difference what the people want – it will all be decided in Springfield after the politicians have been paid. No hurry now, the plant's been there for over 100 years running acid water down the creek (going west) out of the big pond. So go ahead! Do what you're going to do.

Response 7: EPA acknowledges this comment. It is our goal to get the Site cleaned up and ready to be reused as soon as possible.

Comment 8: As village president of Schram City, I am very concerned about the Eagle Zinc property. I am in favor of all phases of cleaning up the Site as soon as possible to prevent chemicals, contaminants, rodents, etc. from causing a possible health hazard to my fellow residents of Schram City. I am also concerned about drainage into the lake. A lot of people, including myself, fish the lake and the possibility of contaminated fish worries me. The buildings, themselves, are an eyesore and the property certainly would look a lot better if they were gone. I appreciate your considering this problem and I would be willing to assist in any way I can.

Response 8: The contaminants associated with the Site have not been found to accumulate in fish. The contaminated sediment and surface water is not likely to have reached the Lake in any appreciable quantity, so contaminants from the Site are not likely to be in the Lake or the fish. The building demolition remedy selected for OU 1 in 2009 will be implemented as soon as EPA can obtain funding.

Comment 9: I really appreciate the way the public hearing was held. We heard lots of technical information, but all information was presented in an understandable manner. I regret more people weren't present; I suspect it's been an issue for so long (in local residents' time frame) that it's achieved "I'll-believe-it-when-I see-it" status. I dreaded assembling a story from the mounds of information, but thanks to your organization and handouts it was easier than I anticipated. I'll email it to you once it's published – on Monday, June 18. I think the adoption of Option 3 is the most logical way to go. Thanks again for keeping us informed.

Response 9: Thank you for the feedback. We will continue to keep you informed about the upcoming work at Eagle Zinc.

Comment 10: I hope that no new houses grow up along the road across from Eagle Picher site. Has the soil, etc, across the road ever been tested?

Response 10: The soil offsite has been tested. There are no unacceptable levels of contamination offsite that can be attributed to the Site. Currently, the Site itself is zoned industrial and a restriction on the property deed prohibits residential development.

Comment 11: I am concerned about the groundwater. Hillsboro and Schram City share some of the water with the new mine; and now the cleanup.

Response 11: The groundwater was tested. The areas where elevated levels of groundwater contamination were found on the Site are located in areas where flow is severely limited, so that groundwater could not be taken from those locations. Hillsboro gets its drinking water from the two lakes in the region. These bodies of water do not have Site-related contamination in them. Also, the water that is provided to residents is treated and tested. If you have concerns about your municipal water, please contact Hillsboro or Schram City representatives.

Comment 12: Please note the lack of tall trees. Nothing would grow for such a long time. I have lived here all my life. Many of us in Schram City were affected by the lack of good vegetation. If that happened to the plants and animals, what will it do to future generations, if not done correctly? I cannot help but remember Love Canal. Please help us.

Response 12: EPA has thoroughly assessed the contamination on and off of the Site. The contamination will be addressed as part of the selected remedial action.

Comment 13: I sincerely hope the dust is controlled during the cleanup. What will be done with the goosenecks and trails? I'm sure there is much zinc sediment in them.

Response 13: Dust will be monitored and controlled during remedial efforts. Sediment onsite has been tested and contaminated portions posing unacceptable risk will be removed.

Comment 14: How far in the ground did you go because it depends on the kind of thing that would go back into the ground what you would stir up?

Response 14: The full depth of soil and sediment contamination was investigated and defined. Care will be taken during the remediation efforts to control any releases that occur as part of removing residue, soil, and sediment.

Attachment 1: ARARs Table

Regulation	Requirement	ARAR Status	Analysis
Chemical-specific ARARs			
Soil and Residue			
IAC Title 35, Part 742, Tiered Approach to Corrective Action Objectives (TACO)	TACO establishes a framework for determining soil and groundwater remediation objectives and standards, and for establishing institutional controls. Tier 1 remediation objectives are set at 10^{-6} ELCR and HI =1 values. Section 742.900(d) Tier 3 remediation objectives allow cleanup levels within the ELCR range of 10^{-4} to 10^{-6}.	TBC	TACO is a voluntary program and is not required (Part 742.105 (a)). It provides guidance for development of site-specific soil and groundwater remediation objectives.
USEPA Regional Screening Level Table for Chemical Contaminants at Superfund Sites,	Screening levels developed using risk assessment guidance from the USEPA Superfund program. They are risk-based concentrations derived from standardized equations combining exposure information assumptions with USEPA toxicity data. Screening levels are considered to be protective for humans over a lifetime; however, screening levels do not address non-human health endpoints, such as ecological impacts.	TBC	Levels may be considered for use as cleanup goals.
Groundwater			
IAC Title 35, Part 620.220; 620.420; IWQS Class II: General Resource Groundwater	Applicable to groundwater compatible with agricultural, industrial, recreational, or beneficial uses and not in Classes I, III, or IV.	ARAR	Applicable to the shallow groundwater.
Surface Water			
IAC Title 35, Subtitle C, Chapter I, Part 302, Illinois Water Quality Standards General Use—Subpart B Sections 302.201-212	Section 11 of Environmental Protection Act—Regulations that establish numerical standards and procedures for deriving criteria for toxic substances without numerical standards, to restore, maintain, and enhance purity of the water of the state. Regulations address: • Acute standards apply within mixing zone • Chronic apply after mixing zone	ARAR	Subpart B applies to Illinois surface waters that do not have a specific use category, such as the east and west onsite drainageways.
Illinois Compiled Statutes 415 (ILCS) 5 Environmental Protection Act, Section 13 NPDES	Authorizes the Illinois Pollution Control Board to issue regulations to adopt water quality standards, effluent standards, standards for the issuance of permits, and requirements for the inspection of pollution sources and for monitoring the aquatic environment, and which directs the Board to adopt requirements, standards, and procedures which will enable the State to implement and participate in the NPDES established by the CWA (33 USC 1251 et seq.). Through Section 401 IEPA regulates activities resulting in a discharge of any pollutant into a wetland.	ARAR	Substantive requirements of regulations promulgated under the IEPA including 401 Water Quality Certification substantive requirements must be met for onsite actions.

Regulation	Requirement	ARAR Status	Analysis
IAC Title 35, Part 304 Effluent Standards	Designates specific effluent limits for discharges to surface water.	Possible ARAR	Substantive requirements must be met for discharges to surface water from sediment dewatering.
IAC Title 35, Part 309 NPDES Permits	Designates process used in setting NPDES effluent limits for discharges to surface water.	Possible ARAR	ARAR for discharges to surface water. Substantive requirements such as monitoring and achieving discharge limits must be met for onsite discharges;
Federal Water Pollution Control Act as amended by the Clean Water Act (CWA) of 1977, Section 208(b), Section 303, Section 304(a)(1)40 CFR Part 131–Water Quality Standards	Establishes water quality criteria for specific pollutants for the protection of human health and aquatic life. These federal water quality criteria are non-enforceable guidelines used by the state to set water quality standards for surface water.	TBC	Water quality criteria are TBCs used in assessing impacts to surface water and in setting NPDES standards for discharges to surface water, such as point source discharges from sediment dewatering. Technically not applicable to ephemeral streams or drainage ways.
NAWQC (National Ambient Water Quality Criteria, USEPA 2006) for protection of aquatic life	Compilation of national recommended water quality criteria containing recommended water quality criteria for the protection of aquatic life and human health in surface water. These criteria are published pursuant to Section 304(a) of the CWA and provide guidance for states and tribes to use in adopting water quality standards.	TBC	May be used in development of cleanup objectives for the site.
Illinois (35 IAC section 302.407) standards for secondary contact and indigenous aquatic life	Provides secondary contact and indigenous aquatic life standards. These must be met only by certain waters specifically designated in 35 IAC Part 303.	TBC	May be used in development of cleanup objectives for the site.
Air			
Clean Air Act –National Primary and Secondary Ambient Air Quality Standards 42 USC Section 7401-7671	The Clean Air Act and implementing regulations define air quality criteria and controls for protecting human health, including standards for particulate matter and inorganic compounds.	Possible ARAR	ARAR if remedial alternative results in air emissions. Substantive requirements for air emission control must be met to achieve air quality criteria.
Illinois Environmental Protection Act, Section 9, 415 ILCS 5/9	Authorizes creation of air quality criteria and controls for protecting human health, including standards for particulate matter and inorganic compounds.	Possible ARAR	ARAR if remedial alternative results in air emissions. Substantive requirements for air emission control must be met to achieve air quality criteria.
IAC Title 35, Subtitle B: Air Pollution	Regulations contain specific requirements that pertain to allowable emissions of criteria pollutants from a number of air contaminant source categories and processes. Chapter I Part 243-245 sets ambient air quality standards for a variety of constituents including particulate matter and lead.	Possible ARAR	ARAR if remedial alternative results in air emissions. Air quality criteria and substantive requirements for air emission control must be met.

Regulation	Requirement	ARAR Status	Analysis
IAC Title 35, Part 245 Odors	Regulations specify how to determine whether a nuisance odor is present.	Possible ARAR	Odor control may be necessary if it is determined that a nuisance odor is present.
Location-specific ARARs			
Section 404 of the Clean Water Act, 33 USC § 1344 - Permits for Dredged or Fill Material 40 CFR Part 230 and 33 CFR Parts 320-330	Regulations to authorize the discharge of dredged or fill material into waters (including wetlands) of the United States. The USACE and USEPA regard the use of mechanized earth-moving equipment in waters of the United States as resulting in a discharge of dredged material unless project-specific evidence shows that the activity results in only incidental fallback. They also consider relocation of a drainage ditch or ephemeral stream to fall within this Act. No discharge of dredged or fill material may be permitted if: (1) a practicable alternative exists that is less damaging to the aquatic environment or (2) the nation's waters would be significantly degraded. Requires that steps be taken to avoid, to the fullest extent practicable, adverse effects, especially on aquatic ecosystems and to provide compensation for any remaining unavoidable impacts. Consultation regarding threatened and endangered species may occur.	ARAR	Substantive requirements are likely to include measures to minimize re-suspension of sediments and erosion of sediments during excavation of sediments or creek re-alignment. Mitigation measures are likely to be required for wetlands.
Protection of Wetlands—Executive Order 11990 40 CFR Part 6, Appendix A	Requires actions to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. Appendix A requires that no remedial alternatives adversely affect a wetland if another practicable alternative is available. If none is available, effects from implementing the chosen alternative must be mitigated.	TBC	The ecological risk assessment noted the presence of wetlands associated with the onsite stream and southwest surface water pond.
The Illinois Interagency Wetland Policy Act of 1989, Chapter 20 Executive Branch, Department of Natural Resources	Directs that State agencies preserve, enhance, and create wetlands where possible and avoid adverse impacts to wetlands from various state-managed or funded activities	TBC	The state's goal for overall no net loss of wetlands can be considered and is consistent with CWA Section 404 mitigation measures.
Fish and Wildlife Conservation Act (16 USC 2901-2912)	Requires federal agencies to utilize their statutory and administrative authority to conserve and promote conservation of non-game fish and wildlife species.	TBC	The Act is considered a potential ARAR for construction activities performed during the implementation of remedies that may affect the drainageways, streams, ponds, and wetlands.

Regulation	Requirement	ARAR Status	Analysis
Action-specific ARARs/TBC			
Federal Water Pollution Control Act as amended by the Clean Water Act of 1977, Section 401	Requires compliance with discharge limitations for discharge to waters, including water quality effluent limits, water quality standards, national performance standards, and toxic and pretreatment effluent standards.	ARAR	NPDES program is administered by the state (see IAC NPDES Regulations). Applicable for actions involving discharges to surface water.
40 CFR Parts 121 and 122 et seq. National Pollutant Discharge Elimination System (NPDES)	Requires the development and implementation of a storm water pollution prevention plan or storm water best management plan and may include contaminant limits. Outlines monitoring and inspection requirements. The IEPA implements the NPDES program and the associated storm water management requirements.	ARAR	Applicable to controlling runoff from construction activities and the soil cover.
IAC Title 35, Part 309 NPDES Permits	Designates process used in setting NPDES effluent limits for discharges to surface water.	ARAR	ARAR for storm water discharges from excavation activities, with substantive requirements outlined in general permits for construction site activities (No. ILR10).
Guidance for NPDES Construction Site Stormwater Discharges in the State of Illinois	Guidance related to implementation of the Federal CWA General Construction Permit program in Illinois.	TBC	Guidance for controlling storm water discharges associated with construction.
Section 404 of the Clean Water Act, 33 USC § 1344 - Permits for Dredged or Fill Material 40 CFR Part 230 and 33 CFR Parts 320-330	Regulations to authorize the discharge of dredged or fill material into waters (including wetlands) of the United States. The USACE and USEPA regard the use of mechanized earth-moving equipment in waters of the United States as resulting in a discharge of dredged material unless project-specific evidence shows that the activity results in only incidental fallback. They also consider relocation of a drainage ditch or ephemeral stream to fall within this Act. No discharge of dredged or fill material may be permitted if: (1) a practicable alternative exists that is less damaging to the aquatic environment or (2) the nation's waters would be significantly degraded. Requires that steps be taken to avoid, to the fullest extent practicable, adverse effects, especially on aquatic ecosystems and to provide compensation for any remaining unavoidable impacts.	ARAR	Requirements apply to dredging and capping. Substantive requirements are likely to include measures to minimize re-suspension of sediments and erosion of sediments during excavation. Mitigation measures are likely to be required for wetlands.
Illinois Stream Mitigation Guidance - Stream Mitigation Method for Processing Section 404 Clean Water Act Permit Applications in the State of Illinois	USACE guidance addresses typical impacts and mitigation methods in the context of compliance with CWA Section 404 and in support of Section 401 water quality certifications.	TBC	Technical and substantive aspects of the guidance will be considered for alternatives that include stream modification or relocation

Regulation	Requirement	ARAR Status	Analysis
Clean Air Act; National Ambient Air Quality Standards (NAAQS) Section 109 40 CFR 50-99	The Clean Air Act is intended to protect the quality of air and promote public health. Title I of the Act directed USEPA to publish national ambient air quality standards for "criteria pollutants." In addition, USEPA has provided national emission standards for hazardous air pollutants under Title III of the Clean Air Act. Hazardous air pollutants are designated hazardous substances under CERCLA. The Clean Air Act amendments of 1990 greatly expanded the role of National Emission Standards for Hazardous Air Pollutants by designating 179 new hazardous air pollutants and directed USEPA to attain maximum achievable control technology standards for emission sources. Such emission standards are potential ARARs if remedial technologies (such as incinerators or air strippers) produce air emissions of regulated hazardous air pollutants. Specifies requirements for air emissions such as particulates, sulfur dioxide, VOCs, hazardous air pollutants, and asbestos.	TBC	The NAAQSs are not applicable to the remedies under consideration. However, they are TBCs because emissions standards promulgated to enforce the Act are potential ARARs for remedies that involve creation of air emissions, such as excavation and earth-moving activities that might create dust.
IAC Title 35, Environmental Protection, *Subtitle B: Air Pollution*	This part describes permits and emission standards to protect air quality.	ARAR	This part is considered an ARAR for remedies that involve creation of air emissions, such as excavation and earth-moving activities that might create dust.
IAC Title 35, Part 212, Subpart K, Fugitive Particulate Matter	Regulations contain specific requirements that pertain to allowable emissions of fugitive particulate matter. Site construction and processing activities would be subject to Sections 212.301, 212.304, and 212.310 to 212.316 which relate to dust control.	ARAR	Remedial action may generate fugitive dust. Dust control must be implemented to control visible particulate emissions during construction, excavation and earthmoving activities. An operating program (plan) is required and is to be designed for significant reduction of fugitive emissions.
IAC Title 35, Part 900 Noise	Regulations contain specific requirements that pertain to nuisance noise levels, sound emission standards and limitations that will be applicable or relevant and appropriate during implementation of the remedy.	Possible ARAR	Noise levels will need to be controlled if noise reaches nuisance levels.
40 CFR 268, Land Disposal Restrictions (LDRs)	The land disposal restrictions prohibit land disposal or require treatment before land disposal for a wide range of hazardous wastes.	ARAR	This is an ARAR for treatment of residue or soils that exhibit a characteristic hazardous waste.
IAC Title 35, Part 728 LDRs	Identifies land disposal restrictions and treatment requirements for materials subject to restrictions on land disposal. Must meet waste-specific treatment standards prior to disposal in a land disposal unit.	ARAR	This is an ARAR for treatment of residue or soils that exhibit a characteristic hazardous waste.

Regulation	Requirement	ARAR Status	Analysis
40 CFR Part 261 Identification and Listing of Hazardous Waste	Soils must be managed as hazardous waste if they contain listed hazardous waste or are characteristic hazardous waste unless they are excluded by regulation. Management of treatment residuals are subject to RCRA if residuals retain characteristic and are not exempt.	ARAR	There is no documented evidence of disposal of listed hazardous waste at the site; however, some residue piles exhibit the characteristic of toxicity for lead. The substantive requirements are ARARs for identifying and managing the characteristic hazardous waste.
IAC Title 35, Part 721 Identification and Listing of Hazardous Waste	Soils must be managed as hazardous waste if they contain listed hazardous waste or are characteristic hazardous waste unless they are excluded by regulation. Management of treatment residuals are subject to RCRA if residuals retain characteristic and are not exempt.	ARAR	There is no documented evidence of disposal of listed hazardous waste at the site; however, some residue piles exhibit the characteristic of toxicity for lead. The substantive requirements are ARARs for identifying and managing the characteristic hazardous waste.
40 CFR Part 262; Standards Applicable for Generators of Hazardous Waste	Establishes regulation covering activities of generators of hazardous wastes. Requirements include identification number, record keeping, and use of uniform national manifest.	Possible ARAR	This is applicable if hazardous wastes are handled on site prior to off-site disposal.
IAC Title 35, Part 722; Standards Applicable for Generators of Hazardous Waste	Establishes regulation covering activities of generators of hazardous wastes. Requirements include identification number, record keeping, and use of uniform national manifest.	Possible ARAR	This is applicable if hazardous wastes are handled on site prior to off-site disposal.
40 CFR Part 264, Subpart B—General Facility Standards	General requirements and of standards for treatment, storage and disposal of hazardous waste.	ARAR	This is applicable to RCRA hazardous waste treatment, storage or disposal facility constructed onsite.
IAC Title 35, Part 724.110 to 724.119 Subpart B—General Facility Standards	General requirements and of standards for treatment, storage and disposal of hazardous waste.	ARAR	This is applicable to RCRA hazardous waste treatment, storage or disposal facility constructed onsite.
40 CFR 264.190 to 264.200 Subpart J–Tank Systems	Standards applicable for owners and operators that use tank systems for storing or treating hazardous waste.	Possible ARAR	ARAR if remedy uses tanks for treatment or storage of hazardous waste such as liquids which exceed TCLP limits.
IAC Title 35, Part 724.290 to 724.300 Subpart J–Tank Systems	Standards applicable for owners and operators that use tank systems for storing or treating hazardous waste.	Possible ARAR	ARAR if remedy uses tanks for treatment or storage of hazardous waste such as liquids which exceed TCLP limits.
40 CFR 264.270 to 264.283 Subpart M–Land Treatment	Standards applicable for owners and operators of facilities that treat or dispose of hazardous waste in land treatment units.	Possible ARAR	ARAR if treatment of residue piles to render them non-hazardous occurs in a land treatment unit.
IAC Title 35, Part 724.370 to 724.383 Subpart M–Land Treatment	Standards applicable for owners and operators of facilities that treat or dispose of hazardous waste in land treatment units.	Possible ARAR	ARAR if treatment of residue piles to render them non-hazardous occurs in a land treatment unit.
40 CFR 264.550 to 264.555 Subpart S–Special Provisions for Cleanup	Standards applicable for corrective action management units, temporary units, and staging piles.	Possible ARAR	Staging piles or temporary units may be needed for residue that may be a characteristic hazardous waste.

Regulation	Requirement	ARAR Status	Analysis
IAC Title 35, Part 724.650 to 724.655 Subpart S–Special Provisions for Cleanup	Standards applicable for corrective action management units, temporary units, and staging piles.	Possible ARAR	Staging piles or temporary units may be needed for residue that may be a characteristic hazardous waste.
40 CFR 264.600 to 264.603 Subpart X–Miscellaneous Units	Standards applicable for owners and operators that treat, store, or dispose of hazardous waste in miscellaneous units.	Possible ARAR	ARAR if treatment or storage of the TCLP hazardous materials is in miscellaneous units.
IAC Title 35, Part 724.700 to 724.703 Subpart X–Miscellaneous Units	Standards applicable for owners and operators that treat, store, or dispose of hazardous waste in miscellaneous units.	Possible ARAR	ARAR if treatment or storage of the TCLP hazardous materials is in miscellaneous units.
IAC Title 35, Part 807 Solid Waste	The Illinois solid waste management regulations apply to the design, permitting, operations, and closure of solid waste disposal facilities used for nonhazardous wastes.	ARAR	This is an ARAR for performance standards related to onsite consolidation, treatment and covering/capping of contaminated materials.
IAC Title 35, Part 742. Tiered Approach to Remedial Action Objectives	TACO establishes a framework for determining soil and groundwater remediation objectives and standards, and for establishing institutional controls. Tier 1 remediation objectives are set at 10^{-6} ELCR and HI =1 values. Section 742.900(d) Tier 3 remediation objectives allows cleanup levels within the ELCR range of 10^{-4} to 10^{-6}.	TBC	TACO is a voluntary program and is not required (Part 742.105 (a)). It provides guidance for development of site-specific soil and groundwater remediation objectives.
USEPA Area of Contamination Policy	Allows wastes within and Area of Contamination to be consolidated and treated in-situ without triggering RCRA LDRs or minimum technology requirements	TBC	Applicable to onsite consolidation, treatment and covering/capping of soils and sediments.
35 IAC, Part 1100	Regulations governing clean fill or demolition debris fill operations.	ARAR	ARAR for placing clean fill.

ARAR	applicable or relevant and appropriate requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cm/s	centimeters per second
DOT	Department of Transportation
ELCR	excess lifetime cancer risk
GMZ	groundwater management zone
gpd	gallons per day
HI	hazard index
IAC	Illinois Administrative Code
IC	institutional control
IEPA	Illinois Environmental Protection Agency
IWQS	Illinois Water Quality Standards
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
NAAQS	National Ambient Air Quality Standards
NCP	National Contingency Plan
NPDES	National Pollutant Discharge Elimination System
RCRA	Resource Conservation and Recovery Act
SDWA	Safe Drinking Water Act
SMCL	secondary maximum contaminant level
SMZ	soil management zone
SWMU	solid waste management unit
TACO	Tiered Approach to Corrective Action Objectives
TBC	to be considered
USC	United States Code

USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

Attachment 2: Administrative Record

U.S. ENVIRONMENTAL PROTECTION AGENCY
REMEDIAL ACTION

ADMINISTRATIVE RECORD
FOR
EAGLE ZINC SITE
OPERABLE UNIT #2
HILLSBORO, MONTGOMERY COUNTY, ILLINOIS

ORIGINAL
AUGUST 29, 2012

NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	00/00/00		File	Title 35: Environmental Protection, Subtitle G: Waste Disposal, Chapter 1: Pollution Control Board, Subchapter f: Risk Based Cleanup Objectives, Part 742 Tiered Approach to Corrective Action Objectives for the Eagle Zinc Site **(SDMS ID: 330985)**	211
2	00/00/00		File	Regional Scoring Level Table Ind Soil April 2009 for the Eagle Zinc Site **(SDMS ID: 330985)**	10
3	01/13/00	Archives of Environmental Contamination and Toxicology	File	Journal Article: Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems	12
4	08/31/84	Lange, R., U.S. EPA	File	Preliminary Site Assessment Report w/ Executive Summary for the Eagle Zinc Site **(SDMS ID: 156081)**	13
5	10/10/84	U.S. EPA	File	Technical Directive Document for Conducting Site Inspections at 48 Illinois Sites w/ Attachments **(SDMS ID: 156087)**	27
6	01/17/96	Illinois EPA	U.S. EPA	CERCLA Expanded Site Inspection Report **(SDMS ID: 156082)**	121
7	01/17/96	Illinois EPA	U.S. EPA	CERCLA Expanded Site Inspection Analytical Results **(SDMS ID: 156803)**	141
8	11/00/96	U.S. EPA	File	U.S. EPA Quick Reference Fact Sheet re: Using Qualified Data to Document an Observed Release and Observed Contamination **(SDMS ID: 282607)**	18

NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
9	12/31/01	Muno, W., U.S. EPA	Respondents	Administrative Order by Consent for the Eagle Zinc Site (V-W-02-C-672) **(SDMS ID: 155531)**	58
10	06/14/02	Runkle, K., IDPH	Addressees	Memorandum re: Draft Health Consultation for the Eagle Zinc Company Site **(SDMS ID: 387504)**	11
11	01/00/03	ENVIRON	U.S. EPA/ Illinois EPA	Technical Memorandum: Remedial Investigation Phase 1 Source Characterization for the Eagle Zinc Company Site **(SDMS ID: 352275)**	230
12	01/00/03	U.S. EPA	File	Community Involvement Plan for the Eagle Zinc Company Site **(SDMS ID: 364651)**	12
13	03/00/03	ENVIRON	U.S. EPA/ Illinois EPA	Technical Memorandum: Remedial Investigation Phase 1 Source Characterization for the Eagle Zinc Company Site **(SDMS ID: 387492)**	234
14	11/00/03	ENVIRON	U.S. EPA/ Illinois EPA	Technical Memorandum: Remedial Investigation Phase 2 Migration Pathway Assessment for the Eagle Zinc Company Site **(SDMS ID: 387491)**	129
15	11/03/03	Jones, R., ENVIRON	Novak, D., U.S. EPA	Memorandum re: Preliminary Information on Human Health and Screening Level Ecological Risk Assessment for the Eagle Zinc Company Site **(SDMS ID: 387505)**	41
16	12/30/03	Novak, D., U.S. EPA	Ball, R., Environ Corporation	Letter re: U.S. EPA Comments on the Preliminary Information on Human Health and Screening Level Ecological Risk Assessment for the Eagle Zinc Site **(SDMS ID: 387506)**	4
17	02/04/04	English, C., CH2M Hill	Novak, D., U.S. EPA	Letter re: Comments on Responses to EPA Comments on the Human Health and Screening Level Ecological Risk Assessment Approaches for the Eagle Zinc Site **(SDMS ID: 387509)**	6

NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
18	03/00/04	ENVIRON	U.S. EPA/ Illinois EPA	Screening Level Ecological Risk Assessment for the Eagle Zinc Company Site **(SDMS ID: 387493)**	148
19	04/05/04	English, C., CH2M Hill	Novak, D., U.S. EPA	Letter re: Review of Human Health and Screening Level Ecological Risk Assessment Reports for the Eagle Zinc Company Site **(SDMS ID: 387513)**	6
20	04/21/04	CH2M Hill	Novak, D., U.S. EPA	Technical Memorandum: Review of the Human Health and Screening Level Ecological Risk Assessment Reports for the Eagle Zinc Company Site **(SDMS ID: 387515)**	16
21	08/00/04	ENVIRON	U.S. EPA/ Illinois EPA	Ecological Risk Screening Evaluation for the Eagle Zinc Company Site **(SDMS ID: 387494)**	213
22	08/00/04	ENVIRON	U.S. EPA/ Illinois EPA	Human Health Risk Assessment for the Eagle Zinc Company Site **(SDMS ID: 387495)**	143
23	11/02/04	Montgomery County, IL	File	Environmental Deed Restriction for Property Located in Montgomery County, IL **(SDMS ID: 362866)**	8
24	02/01/05	ENVIRON	U.S. EPA/ Illinois EPA	Remedial Investigation Report for the Eagle Zinc Site **(SDMS ID: 246559)**	713
25	02/01/05	ENVIRON	U.S. EPA	Remedial Investigation Report of the Eagle Zinc Company Site **(SDMS ID: 282604)**	300
26	04/00/05	ENVIRON	U.S. EPA/ Illinois EPA	Addendum to the Remedial Investigation Report for the Eagle Zinc Company Site **(SDMS ID: 387496)**	199
27	02/00/06	ENVIRON	U.S. EPA/ Illinois EPA	Addendum to Remedial Investigation Report for the Eagle Zinc Company Site **(SDMS ID: 352284)**	219

NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
28	10/30/07	U.S. District Court/Northern District of Ohio	Respondents	Deposition of Luther Moler re: the Eagle Zinc Site **(SDMS ID: 330988)**	99
29	10/30/07	U.S. District Court/Northern District of Ohio	Respondents	Deposition of Morris Dodd re: the Eagle Zinc Site **(SDMS ID: 330991)**	81
30	06/23/09	Cundiff, L., CH2M Hill	Simmons, N., U.S. EPA	Technical Memorandum re: Review and Description of Illinois EPA XRF Sampling of Waste Materials at the Eagle Zinc Superfund Site	4
31	08/10/09	ATSDR	File	Health Consultation for the Eagle Zince Company Site **(SDMS ID: 334585)**	7
32	12/13/11	Glenn, M., Attorney at Law	Kreuger, T., U.S. EPA, et al.	Letter re: Environmental Covenant of T.L. Diamond & Company, Inc.	14
33	04/19/12	CH2M Hill	DiCosmo, N., U.S. EPA	Technical Memorandum: Eagle Zinc Groundwater Classification	
34	04/23/12	DiCosmo, N., U.S. EPA	Wilson, D., Illinois EPA	Letter re: Groundwater Classification Analysis for the Eagle Zinc Site	
35	05/00/12	CH2M Hill	U.S. EPA	Final Report: Feasibility Study for Eagle Zinc Superfund Site	426
36	05/00/12	CH2M Hill	U.S. EPA	Supplemental Remedial Investigation Report for the Eagle Zinc Site	728
37	05/02/12	Wilson, D., Illinois EPA	DiCosmo, N., U.S. EPA	Letter re: Classification of Groundwater at the Eagle Zinc Site	
38	06/00/12	U.S. EPA	Public	Proposed Plan for Operable Unit 2 at the Eagle Zinc Site	19
39	06/14/12	Jensen Reporting	U.S. EPA	Transcript of June 14, 2012 Public Meeting for U.S. EPA Proposed Waste Cleanup at the Eagle Zinc Site	63

NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
40	06/19/12	Concerned Citizens	U.S. EPA	Seven Letters/Public Comment Sheets re: Comments on the Proposed Cleanup Plan for the Eagle Zinc Site **(PORTIONS OF THIS DOCUMENT HAVE BEEN REDACTED)**	